

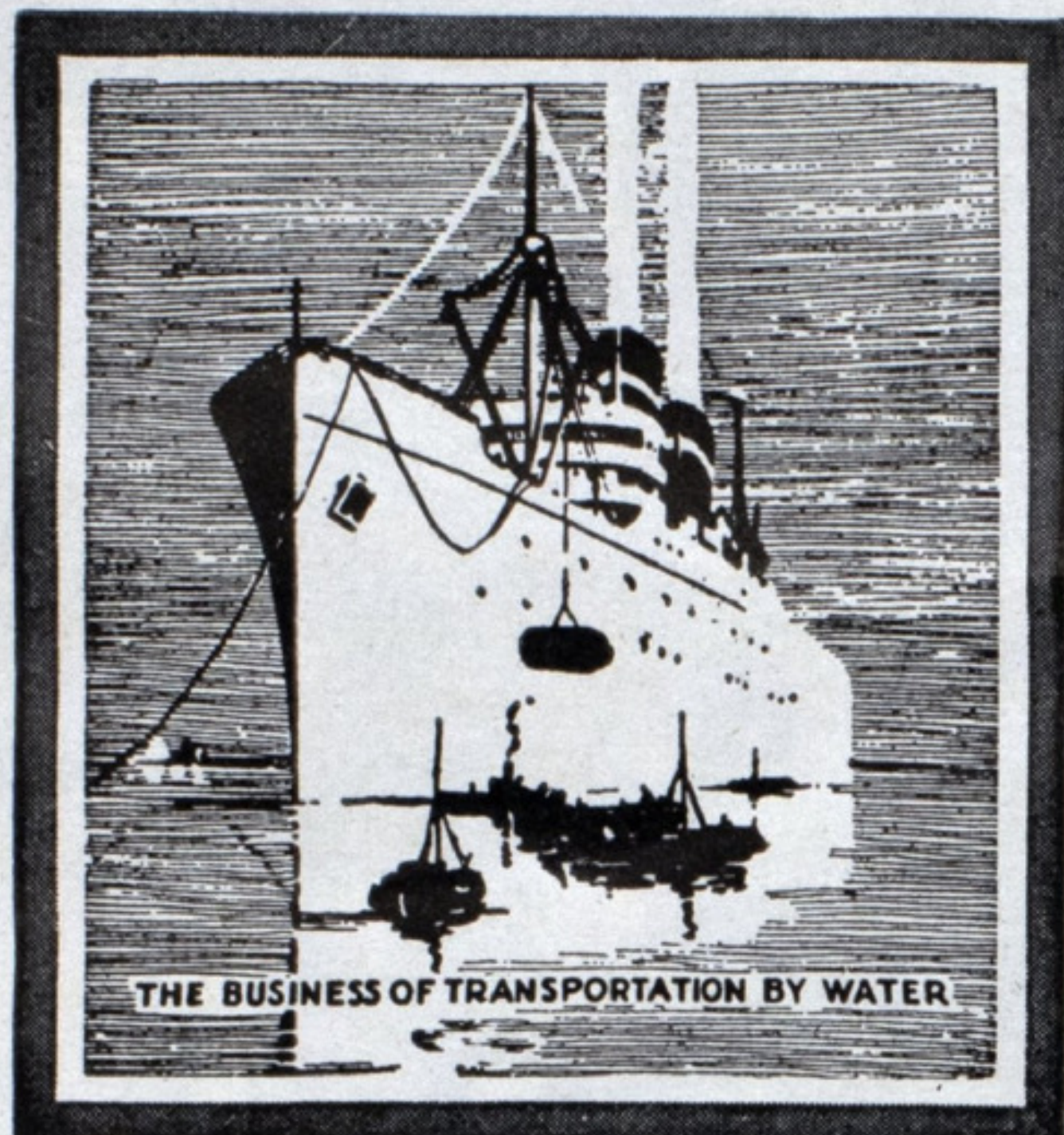
# Marine Review

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# « EDITORIAL »

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## Relative Strength of Navy Must be Maintained

**N**O ONE can fairly believe that the President of the United States is not exerting his utmost endeavors in the best interests of the nation, in all its multifarious activities, as he sees them. But he may be pursuing a mistaken policy in regard to the navy. Certainly, the report of the committee appointed by him to examine the accuracy of the assertions of fact made by President Gardiner of the navy league will not affect the opinion of those Americans who feel that we should keep our relative strength up to that of the other powers which joined with us in disarmament agreements.

There is merit no doubt in the disarmament agreements if none of the parties to these agreements gains an advantage. Even though that advantage may come by the neglect of one of the parties in keeping up to the pace set by the others the agreements fail in their purpose.

The main point is, not building completely up to the limits allowed, but in keeping step with what the others are doing. From the controversy between the President and the navy league, it seems apparent that we are not doing so. We do not need to look with suspicion on the motives of other nations, but we can hardly expect them not to take advantage of such opportunities as we may give them by indifference. This is a matter that will receive the careful attention of congress and our relative naval position must be maintained.

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## Stopping Work on the New Cunarder

**T**HE suspension of work on the new super liner for the Cunard Steamship Co. Ltd., is not likely to be of long duration. Means will be found to continue the work. The new ship was to be launched in May, 1932 and was to be ready for service during the late summer of 1933. No name has yet been selected for

this giant ship which is to be 1018 feet in length and of 73,000 gross tons. She will be driven by single reduction geared turbines supplied with steam from high pressure watertube boilers. Each of the four propellers will be driven by an independent set of machinery, comprising four turbines with pinions meshed to a large gear wheel connected to the line shafting.

It can fairly be assumed that all of the engineering features of the new Cunarder will represent the highest development of the ship-building art. A speed as high as 32 knots has been mentioned.

Irrespective of national rivalries for the blue ribbon of the Atlantic, it would be a loss to the whole world if the completion of this vessel were to be permanently abandoned. The postponement is due to the drastic decline in revenue during the current year. The earnings, apparently, have not been sufficient to meet the depreciation on its old ships and financing the building of the new ship under present conditions is too heavy a burden for the company to carry.

Though no application, so far as known, has yet been made to the British government for aid in this emergency, it would seem a measure of public policy for the government to give whatever aid or guarantees as may be necessary to complete the building of the ship. It is hoped that some way out of this difficulty will soon be found.

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## Awarding Contracts for Naval Ships

**T**HE navy department on Sept. 16, opened bids for the construction of five destroyers. Contracts were awarded, one each, to the New York navy yard, the Boston navy yard, the Puget Sound navy yard, the Bath Iron Works Corp. and the Bethlehem Shipbuilding Corp.

One of the unsuccessful bidders, the United Dry Docks, Inc., having submitted a bid of \$2,645,000 on the navy department's own design and next in amount to that of the Bath Iron Works Corp. at \$2,626,000, requested the op-

inion of J. R. McCarl, comptroller general of the United States in the matter of these awards.

The comptroller general in a letter to the secretary of the navy, dated Dec. 10, reviewed the case at considerable length, in which it was brought out that subsequent to the original advertisement for bids, the secretary of the navy informed the companies which had received these specifications that the navy department had decided to permit alternate bids on the bidder's own design. Bids were submitted by the various builders on their own design as well as on the navy's design and under the former specifications the Bethlehem Shipbuilding Corp. was low with a bid of \$3,070,000 as against that of \$3,166,000 for the Bath Iron Works and \$3,720,000 for the United Dry Docks. In its invitation for bids on builder's own design, the navy department summarized its method of the evaluation of the bids for the guidance of all bidders.

#### **Position of the Unsuccessful Bidder**

The position of the United Dry Docks, Inc., in this matter is based, as noted in its letter to the comptroller general, on the question, "Whether the navy department can call for competitive bids where different bidders are not bidding on the same thing and where the final award of contract is not upon a definite money value, but is dependent on the judgment of officers in the department as to the relative merits of more or less intangible properties in different designs; and, if such bidding is permissible and if the department instructs bidders as to the method of evaluating their bids on a money basis, can it thereafter depart from the principles that it establishes for such evaluation and award a contract on the basis of other intangible benefits accruing from one design as against another?"

#### **Opinion of the Comptroller General**

On the basis of this letter the comptroller general reviewed, in his communication to the secretary of the navy, certain other cases involving similar principles and came to the conclusion that, "...the alternate bids specifications in this case are open to question. . ." He recommends since it is essential, "...that the United States should obtain the best possible vessels for the money expended, and that in connection with construction work of this character the navy department has its problems and would find it advantageous to utilize the best skill of the country in designing such ves-

sels, hull, machinery, etc., . . . the advisability of acquainting the congress with the situation and need with the view of securing authority to employ a reasonable amount of the appropriation to secure from competent sources outside of the government a limited number of designs of hulls, machinery, etc., to supplement or for comparison with plans and specifications drafted by the navy department to the end that there may be worked out the best possible design and the final results submitted for competitive bids and construction by the low responsible bidder."

#### **Causing Dissatisfaction Among Bidders**

The comptroller general also found that, "... the procedure followed . . . will invariably breed dissatisfaction among bidders. Each bidder submitting on alternate design will doubtless believe, and honestly, that his is superior to all other designs submitted—and that it would seem most difficult, if not quite impossible to work out in advance and without intimate knowledge of details of design to be submitted, an evaluating formula that would be considered fair by any bidder whose design was not accepted. . ."

However, his conclusions were: "It is understood that on the assumption the procedure followed was in sufficient compliance with the applicable law there has been adopted for building in two navy yards, the design submitted by the Bethlehem Shipbuilding Corp., and award made to said corporation for the construction of a vessel of such design. In such circumstances and in view of the apparent good faith of the navy department in following the procedure discussed and which should hereafter be otherwise, this office will make no further objection thereto."

#### **On Establishing a Better Method**

There can be no question of the good faith of the navy department in the award of these contracts. The whole trouble lies with the method which is subject to criticism because of the intangible factors involved in arriving at a decision. The navy department must not be so hampered by red tape that it will be forced to go contrary to the best judgment of its responsible heads, but this is not to say, especially when no haste or emergency exists, that a method, which will give full play to the opinions of the experienced officers of the navy, cannot be worked out, which at the same time will give no opportunity for a feeling of injustice done to any bidder.

# Launch Largest U. S. Merchant Ship

**S. S. Manhattan, 30,000-Ton Liner Building at Camden for United States Lines Will Enter Service in July**

**C**ONCEIVED in the spirit of American enterprise, built to the highest standards of American shipbuilding practice, sponsored by the widow of one of the greatest Americans and christened with water from the forty-eight states, the liner MANHATTAN, largest merchant vessel ever built in an American shipyard, was launched at Camden, N. J., Dec. 5. This vessel is under construction by the New York Shipbuilding Co. for the United States lines and will enter service early this coming summer. Mrs. Theodore Roosevelt, wife of the former president of the United States, who was an aggressive champion of a strong American merchant marine, acted as sponsor. The launching was attended by many leaders in government, shipping and financial circles. The ceremony was broadcast over a nationwide network. Clinton L. Bardo, president of the New York Shipbuilding Co. acted as toastmaster at a luncheon at the Walt Whitman Hotel following the ceremony. Mr. Bardo introduced the speakers who were: T. V. O'Connor, chairman of the United States Shipping Board, W. Irving Glover, second assistant postmaster general and Senator Royal S. Copeland of New York.

The MANHATTAN is the first of two new 20-knot sisterships building for the United States lines. Contracts for building these two ships were awarded May 29, 1930, and the keel of the MANHATTAN was laid Dec. 6. These ships will rank not only as the largest merchant vessels built in this country but also among the largest ships now operating on the Atlantic. The principal dimensions are: Length overall, 705 feet, length on waterline 685 feet, length between perpendiculars, 660 feet, molded beam, 86 feet, depth to promenade deck, 79 feet, designed deadweight, 12,000 tons, loaded displacement 32,000 tons. The vessels will have a carrying capacity of 1300 passengers. Seven decks will be devoted



*The largest American-built liner, Manhattan—launched at Camden, Dec. 5*

to passenger accommodations consisting of full sized beds, telephones, garages, swimming pool, a veranda cafe as well as spacious decks for sports and recreation. The vessel will have an air conditioning system.

The MANHATTAN is of modern design throughout and will have an appearance of grace and speed. There will be two low raked elliptical funnels. The bow will be of the semi-bulbous type, the vessel will have a raked stem and a stern of the merchant counter cruiser type. The interior of the new ship will be of exceptional quality throughout. There will be large lounges done in the Georgian,

Jacobean or Tudor design equipped with stages and talking motion picture equipment. Every need and comfort of the traveler has been considered in the arrangement of the public rooms and staterooms. Plywood and plymetal have been used.

The vessel will be propelled by twin screws driven by triple series turbines and single reduction gears developing 34,500 shaft horsepower.

Special study has been given to safety and all regulations adopted by the Conference on Safety of Life at Sea will be complied with. Every practical safety device known to modern science will be installed.

Auxiliary equipment will be electrically operated and will be supplied by the Westinghouse Electric & Mfg. Co. The equipment will include 166 motors totaling approximately 3330 horsepower and ranging in size from 1/10 horsepower to 115 horsepower. These motors will be used for hull ventilation, for operating cargo winches, anchor windlass, capstans and steering gear. The motors will operate 23 different kinds of pumps for fire, drinking water, fuel oil, lubricating oil, ballast, etc.



*In the launching party. Capt. George Fried (right) who will have command of the new liner and standing at his right Mrs. Theodore Roosevelt, who acted as sponsor*

# New Turbine Electric Liner Talamanca

## Sails on Maiden Voyage, Dec. 23

### First of a Fleet of Six for United Mail S. S. Co.

**A**NOTHER outstanding American merchant vessel turned out during 1931 is the twin screw turbine electric fruit and passenger steamship TALAMANCA, delivered on Dec. 12, by the Newport News Shipbuilding & Dry Dock Co. to the United Mail Steamship Co., a subsidiary of the United Fruit Co., Boston. The new vessel sailed on her maiden voyage from New York to San Francisco on Dec. 23.

The TALAMANCA is the first of six sister ships for which contracts were placed in August, 1930, all of which will join the "Great White Fleet" within the next few months. The orders for three of these vessels were placed with the Newport News Shipbuilding & Dry Dock Co. and for the other three with the Bethlehem Shipbuilding Corp. at its shipyard at Quincy, Mass.

An unusually impressive ceremony marked the twin launching of the TALAMANCA and sister ship SEGOVIA at Newport News, Va., on Aug. 15, with the wife of the President of the United States acting as sponsor. (See MARINE REVIEW for September, 1931). The third vessel building at Newport News, the CHIRIQUI, was launched Nov. 14. Of the remaining three, the ANTIGUA, QUIRIGUA and VERAQUA building at the Fore River plant, Quincy, Mass., of the Bethlehem Shipbuilding Corp., the first was launched Dec. 12.

#### Successful Sea Trials Held

On Dec. 1 the TALAMANCA was given an all-day sea trial off the Virginia capes, during which speed and economy runs were made between Chesapeake and Winter Quarter Light vessels, a distance of 67.5 nautical miles.

One run was made in each direction, the average speed obtained being 19.46 knots and the average shaft horsepower developed 11,150 at 129.5 revolutions per minute.

Although the average depth of water over the course is only about 82 feet, which is rather shallow for a vessel of the size and speed of the TALAMANCA, the results obtained easily exceeded the contract guarantees for speed and power, and the fuel consumption was well below the guarantee. The speed on the trial run was taken by observation and also by means of the pressure log which has recently been developed at the Washington model testing basin. The results by the two methods were in remarkably close agreement, indicating that the pressure log is a reliable means for determining a ship's speed.

In addition to the full power runs two short runs were also made with one generator supplying current to both motors. Throughout all the trials the machinery functioned without a pitch of any kind. The average draft on the trials was about 20 feet and the vessel should be able to maintain a speed of well in excess of 18 knots at service draft. This speed gives considerable margin over the guaranteed speed of 17½ knots.

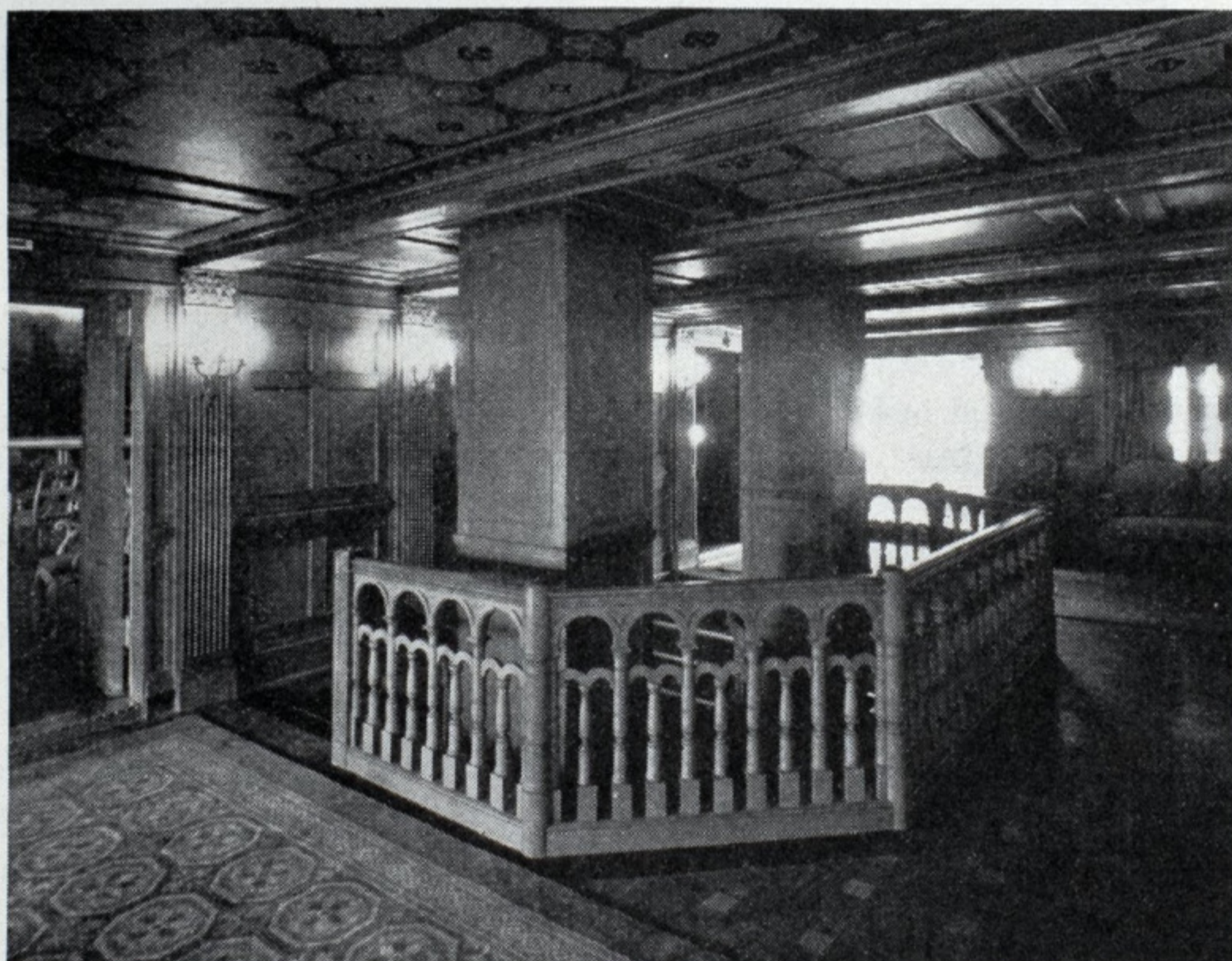
#### Has No Superior in Her Class

This vessel represents the highest standards and has no superior in her class. Especially is this true of the refrigerating system and the propulsive machinery in both of which many new ideas developed by H. H. Robson, general manager of the marine department of the United Fruit Co., and his staff, have been carried out. In the operation of the large fleet of vessels under his charge Mr. Robson has made a remarkable record in reducing fuel consumption and increasing all-round efficiency. All indications are that the TALAMANCA and her sister ships will prove to be a distinct advance over any ships yet built for that trade.

The owner believes that successful operation depends as much on the personnel as on the equipment. Particular care has therefore been taken to give comfortable living quarters to officers and crew. Individual staterooms are provided for each of the deck and engineer officers with practically all the conveniences of regular passenger staterooms for comfort in both hot and cold climates.

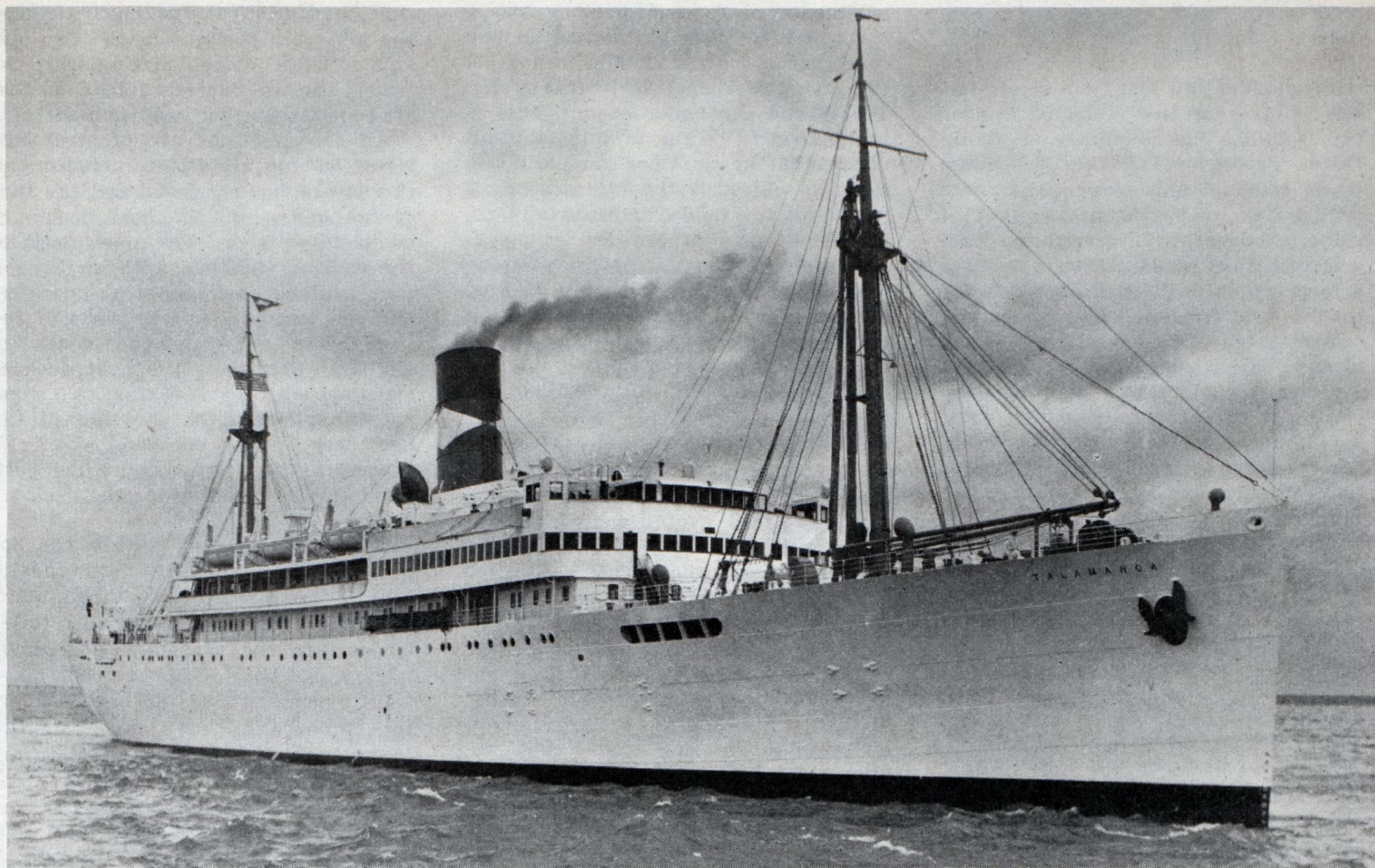
A large comfortable lounging room is provided for the engineers. The

Main lobby and stairway of the S. S. Talamanca. Simplicity of design with good workmanship give an especially attractive effect



Passenger lounge on the S. S. Talamanca. Modern Spanish is evident in decorations. The stenciled ceiling is a feature of this period





*Twin screw turbine electric liner Talamanca of the United Mail Steamship Co. Maiden voyage Dec. 23, New York-San Francisco*

quarters for all deck and engineer officers are located in steel deck houses on the boat deck, those for the steward's department are all on the starboard side of the upper deck amidships, and the remainder of the crew are in the poop. There is a separate electrically equipped galley for the crew.

The hull and machinery were built under the special survey of the American Bureau of Shipping, in accordance with plans approved by the bureau to the highest class "with freeboard." The classification includes the hull, propulsive machinery, electrical plant, refrigerating plant, and equipment.

The vessel also meets all requirements of the United States shipping board, and of the navy, including compliance with all applicable regulations of the international safety at sea convention (1929) and some additional ones. Complete ratproofing is one of the latter, and this and other requirements of the United States public health service, such as segregation of all fresh water for domestic use from all other fresh water, have been carried out.

All design details of the hull and machinery, as well as the actual construction of these vessels have been under the efficient general supervision of Capt. D. H. Young, superintendent of new construction of the United Fruit Co, who has for many years supervised the construction of all the vessels built for that company. Associated with him in this work is his capable assistant, J. V. O'Sullivan.

The chief resident inspector for all three vessels building at the Newport News yard is T. B. Selkirk.

It is expected that the *SEGOVIA* will be delivered about the end of January, 1932, and the *CHIRIQUI* about the middle of March. (Unfortunately the *SEGOVIA* was very seriously damaged by fire Dec. 20.)

#### General Design Worked Out

Prior to the awarding of contracts for the *TALAMANCA* and sister ships the Newport News company was commissioned by the owner to develop the design of a vessel which would be thoroughly modern in its general characteristics and embody those features which the owner's long and varied experience in the carriage of fruit and passengers has shown to be most suitable. Several different sizes were investigated and preliminary plans drawn.

While the passenger trade is important as is also the carriage of general cargo, the carriage of fruit is the main business, and the cubic capacity for the carriage of bananas was the determining feature. This capacity having been fixed by the owner, as well as the speed requirement and the number of passengers to be accommodated, the principal dimensions were determined by the Newport News company. The general design was then developed in close co-operation with the owner, represented by H. H. Robson and Capt. D. H. Young.

Due consideration was given to the requirements of the United States

shipping board for vessels built under "loan agreement," including full compliance with the requirements of the safety at sea convention (1929), and in at least one important feature in excess thereof. Several models were tested in the Washington model basin, both towed and self-propelled, before the final lines were adopted. The shape of the appendages was also carefully investigated in order to reduce the resistance to a minimum and facilitate streamline flow, and the twin screw bossings as fitted embody the latest ideas developed in model testing basins. In line with the best modern practice the rudder is also streamlined.

The principal dimensions and particulars are as follows:

Length over all, feet, inches	446	9
Length 24-foot waterline, ft...	430	
Length between p. ps., feet....	415	
Beam, molded, feet .....	60	
Depth, molded to upper deck		
feet, inches .....	34	9
Max. draft, molded, ft. in....	24	9
Displacement at same, tons....	11,345	
Gross tonnage .....	6,963	
Net tonnage .....	3,183	
Cargo capacity, net cubic ft.	196,000	
Fuel oil capacity, tons.....	1,450	
Fresh water capacity, tons..	626	

Unlike the majority of American merchant vessels of recent years, of about the same speed-length ratio, these ships do not have a bulbous bow. Instead they have the ordinary flat bar stem with a slight forward rake, and as customary in fairly fine vessels the lower section is a steel casting conforming to the shape in that region, and the forefoot is cut up

moderately. The type of stern also differs from the cruiser type, which has come to be so largely associated with medium and fast twin screw vessels, and is of the protected rudder type. It has the advantage of giving better protection to the propellers when docking, and many shipowners still prefer its appearance to that of the cruiser stern. In association with a stream lined rudder this type gives a form which is little, if any, inferior to the cruiser type. The rudder is semibalanced, with a cast steel frame in one piece to which the double plates are electrically welded, and there are two brass encased pintles which work in lignum vitae bearings. The rudder stock is of forged steel secured to the frame through a horizontal flanged coupling.

The TALAMANCA with her two well placed masts, one stack and nicely formed stern presents a symmetrical, shipshape and pleasing appearance. She has a combined forecastle and bridge, a poop with a short well between it and the bridge, and three tiers of erections above the bridge deck. There are four completely plated steel decks in the hull proper, and eight watertight bulkheads, all of which extend to the upper deck or beyond, subdividing the vessel into nine compartments. This subdivision is in excess of the requirements of the safety at sea convention (1929) and gives a two compartment vessel, able to keep afloat with any two compartments flooded.

#### Cost Increased by Subdivision

In no other type of ship have the subdivision requirements of even the safety at sea convention caused such an increase in the cost of construction as in fruit carriers. This is due to the fact that the shorter compartments now required necessitate a decided increase in the number of air cooling units, and in addition to the cost of the latter these additional units make a very appreciable reduction in the space available for cargo. Consequently larger ships are now required to obtain the same net cargo capacity as in earlier ships in which long com-

partments were permitted.

An item of special interest in the construction of the double bottom is the fitting of a duct keel between No. 1 hold and the boiler room. This is understood to be the first installation of its kind in an American built vessel. Its object is the elimination of piping in the holds, an especially desirable feature where the compartments are insulated. At the extreme forward end, where the ship is fine, the double bottom extends to the orlop deck forming a deep tank which is used for the carriage of fuel oil and is also available for water ballast.

All double bottom compartments forward of the engine room are arranged to carry fuel oil or water ballast, and all compartments aft carry fresh water for boiler feed. Additional fresh water capacity is provided in two tanks built-in abreast the thrust recess off the engine room, and between the shaft tunnels aft of the refrigerating machinery room. For additional fuel oil capacity there is a deep tank immediately forward of the boiler room, divided into four compartments athwartship, the two center ones being used for service tanks.

In order to avoid the possibility of any oil leaking into cargo spaces or streaking the sides of the vessel, cofferdams are fitted between the deep tank and the cargo hold, also at the sides and top of the tank. These cofferdams also permit of repairs being made to the tanks without the necessity of placing the ship in dry dock. Since the hull is painted white, and at tropical ports the ship loads at piers in open roadsteads where sudden violent storms arise, the danger of shell damage is very real and if oil were in direct contact with the shell the appearance of the vessel would be apt to be marred by oil streaks. As a fur-

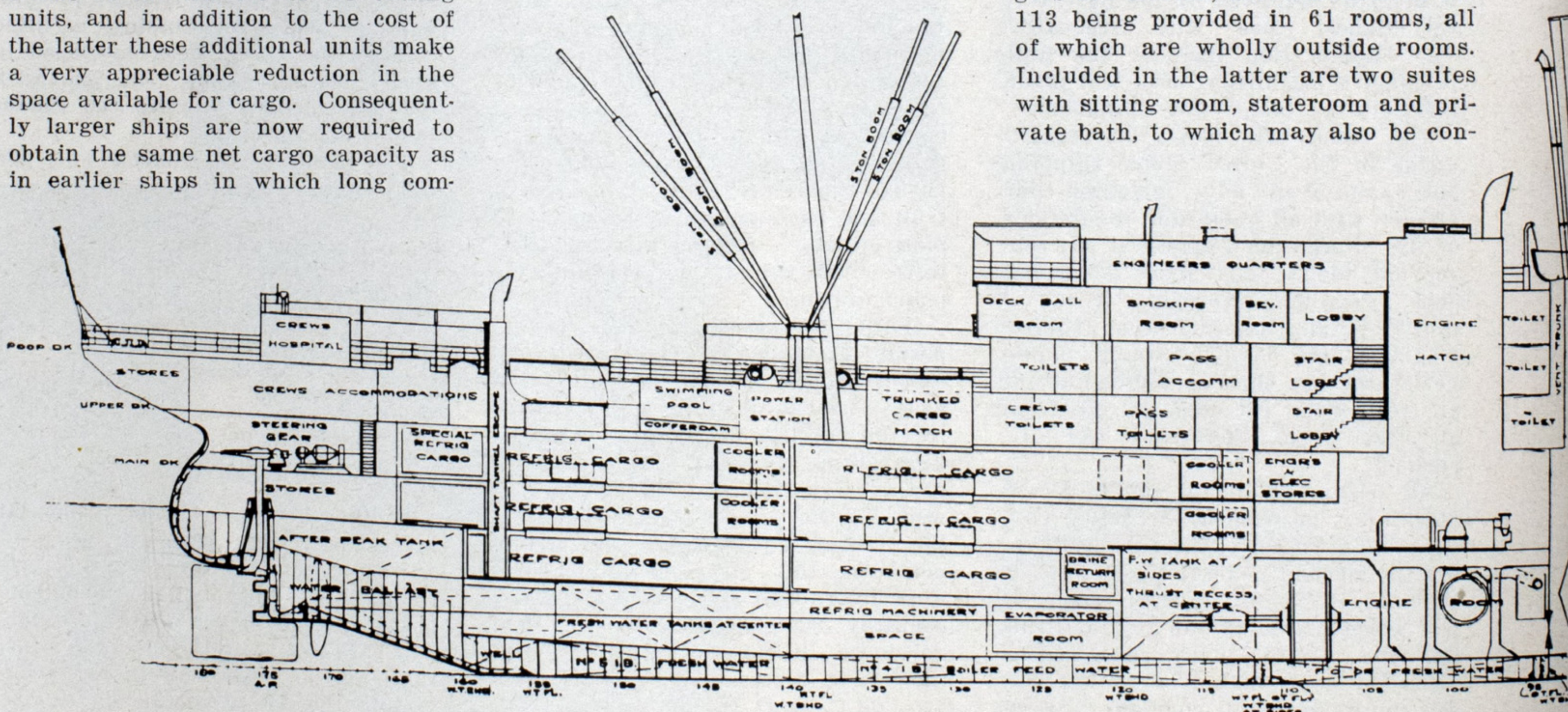
ther precaution against such damage the amidship portions of the two outside strakes of shell plating near the water line are increased in thickness above classification requirements.

All the erections are of steel construction and all decks, including all the superstructure decks and the tops of the houses on the boat deck, are completely plated. The upper deck, in the well, is sheathed with an Oregon pine caulked deck and teak margins, and the weather exposed parts of the poop, bridge and promenade decks are similarly sheathed; the boat deck is sheathed with teak decking. No wood sheathing is laid on the tops of the boat deck houses—the steel plating is exposed to the weather and 3 inch cork insulation is fitted under the deck instead.

For deck covering within the superstructure Selbalith magnesite floor is used practically throughout, except in galley, pantry and toilet spaces. In the passenger accommodations and boat deck house the magnesite forms a base for other covering, and in the crew's spaces on the upper deck and in the poop it forms the finished floor. All floors in passengers' public and private toilets, and in officers' toilets, are laid with ceramic tiles, and quarry tile is laid in all galley and pantry spaces. In all passenger staterooms, and in all the officers' and crew's accommodations on the boat deck, the floor covering is rubber tile furnished by the United States Rubber Co.

#### Modern Passenger Accommodations

Accommodations for passengers include many features heretofore confined to the largest passenger ships. Among these are a permanent out door swimming pool and a deck ballroom. Only first class passengers are carried, accommodations for 113 being provided in 61 rooms, all of which are wholly outside rooms. Included in the latter are two suites with sitting room, stateroom and private bath, to which may also be con-



*Inboard profile United Mail Steamship Liner S. S. Talamanca. In excess*

nected two single staterooms having private toilet and shower.

There are also six staterooms with private bath, eight with a connected private bath between two adjoining staterooms, and nine rooms with private toilet and shower. All the rooms with private shower and toilet are single; those on the promenade deck, where that type of room is fitted exclusively, also have a sofa berth, these rooms being amply large for two persons when desired. In addition to the foregoing, there are seven one-person staterooms. Single metal beds are fitted in all staterooms; in only two of the regular staterooms are there any upper berths. A number of rooms are arranged with a door communicating with the adjoining stateroom, enabling the rooms to become en suite. The staterooms are fully equipped with modern conveniences, such as large built-in wardrobes, combined dressing table and desk, electric fan, lavatory with hot and cold running fresh water, and a complete set of chromium plated toilet fixtures for each person the room accommodates.

#### Special Metal Framed Windows

Each stateroom on the bridge and promenade decks has two Kearfott metal framed windows of the vertically sliding type; staterooms on the upper deck are fitted with a special pivoted type airport. Mechanical ventilation is supplied to all staterooms, the amount of air being regulated at will by the occupants by means of a specially designed louvre recently developed by the Newport News Shipbuilding & Dry Dock Co. The ventilation system is connected with heaters to heat the air to the desired temperature in cold weather. Staterooms on the promenade deck are also provided with steam heat.

All passenger accommodations are located amidships in the superstructure, the promenade and bridge decks being entirely devoted to passenger use, while a large portion of the

bridge enclosure is similarly used. The boat deck is also available as a sun and promenade space. Extensive public spaces are provided, and those in most general use are grouped on the promenade deck. Its forward end is fitted at front and sides with Kearfott sashless windows to form a glass enclosed promenade, and at the after end there is a somewhat similarly enclosed deck ball room which adjoins and is directly connected to a large smoking room.

Forward of the smoking room is a stairway lobby to the lounge, a large comfortably furnished room with a hardwood floor which is used for formal dances and general social functions. In way of the lounge the deck above is raised to give a deck height of 12 feet and the entire area is clear of pillars. The lounge is surmounted by a large dome skylight, and this in conjunction with the increased deck height makes a very attractive room, to which an open fireplace with magicoal grate adds a further note of comfort.

Adjoining the lounge on its forward side is the forward main stair lobby and immediately forward of the latter is a library and writing room which is located at the forward end of the house. The windows in the two lobbies, and in the library, lounge and smoking room, are a very substantial bronze, casement type furnished by Henry Hope & Sons.

The main entrance lobby is located on the bridge deck at the forward stairway and the pursers office is directly forward of it. At the after stair lobby on the bridge deck there is a gift shop, aft of which is a barber shop. The main dining saloon is located on the upper deck forward of the main stairway and has a seat-

ing capacity of 108 at small tables.

Immediately aft of the dining room are the main galley and pantry spaces which are fully equipped with cooking and food-serving appliances, most of which, including the ranges, are electrically operated. At the after end of the bridge deck there is an open-air swimming pool. A hospital for passengers is provided (in addition to a crew's hospital) adjoining the doctor's office, and there is also a well-equipped surgery.

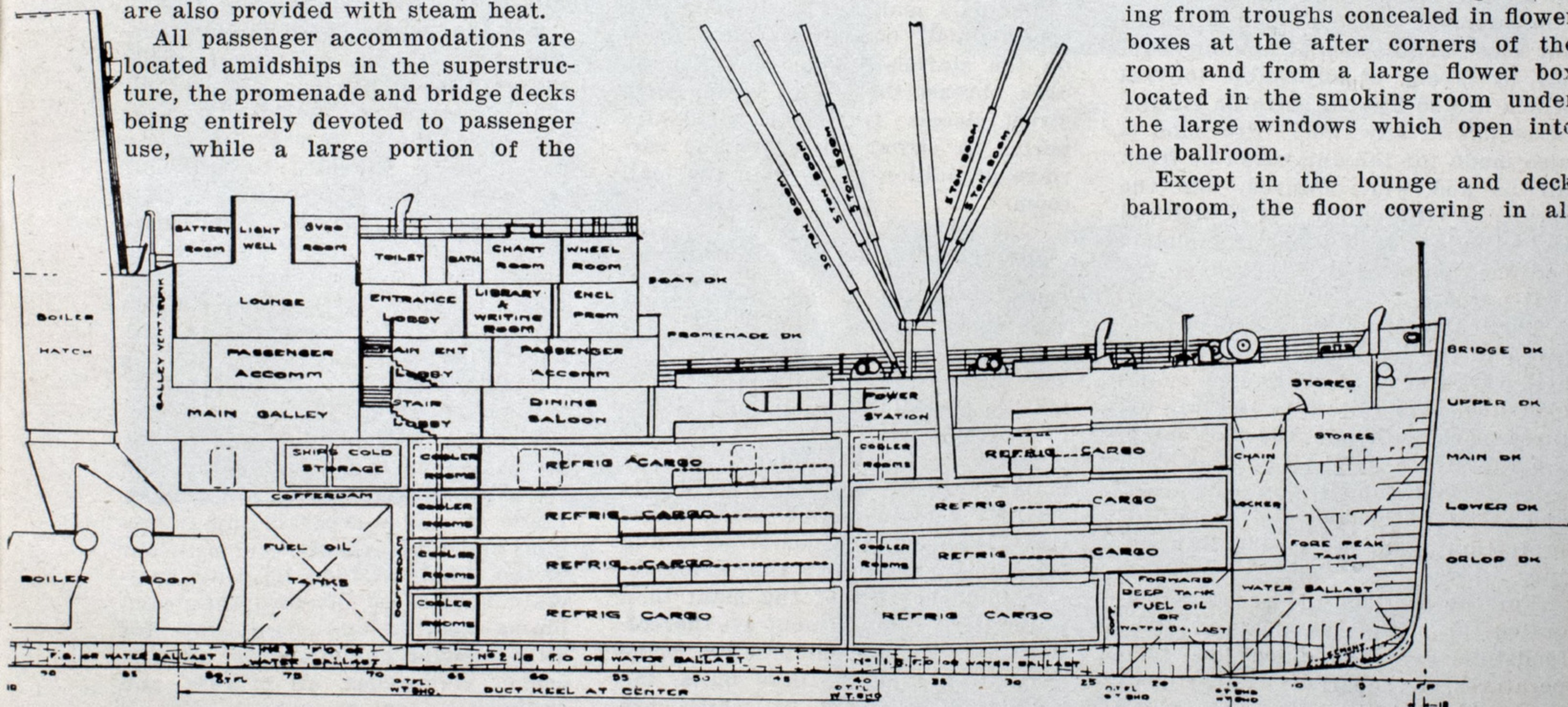
The architectural design of all the public spaces is the work of Barnet Phillips and J. P. Kiesecker, Associates, who also did the interior decorating and arranged for the furniture and draperies. Modern Spanish is the dominant note in the design and furnishings of the principal public spaces. The stenciled ceilings which are such a prominent feature of that type of architecture have been admirably carried out.

In the dining room and lounge a paint finish is used, and all lobbies, the library, the passages in the promenade deck house, and the main stairways are paneled in mahogany stained a dark brown. The smoking room is paneled in specky cypress, with a corresponding beamed ceiling.

#### Lighting of Modern Design

Electric fixtures are all of special design to harmonize with the general design of individual spaces. In the deck ballroom the general lighting is furnished by Spanish lanterns, finished in antique iron, and for night dancing there are trough lighting fixtures with heavy corrugated crystal glass panels located in the cornices at convenient stations. These fixtures are fitted with blue lamps to give a moonlight effect in conjunction with a flood of yellow light coming from troughs concealed in flower boxes at the after corners of the room and from a large flower box located in the smoking room under the large windows which open into the ballroom.

Except in the lounge and deck ballroom, the floor covering in all



of requirements of Safety at Sea convention (1929). A two-compartment ship

of the public spaces, including lobbies and passages, is rubber tile furnished by the United States Rubber Co. and laid by the shipbuilders; a hardwood floor is laid in the lounge and a calked teak deck with wax finish in the deck ballroom.

All the public spaces are provided with mechanical ventilation, the systems being provided with heaters for heating the air when desired. Steam radiators are also fitted, thus providing two entirely separate heating systems and ensuring ample heat in the coldest weather.

A centralized radio system of the latest type is another of the many modern features provided for the entertainment of the passengers. This is located in a separate room amidships on the promenade deck.

### Cargo Handling Arrangements

It will be noted from the accompanying plan that the subdivision of the hull provides two cargo holds forward of the machinery spaces and two aft. With the four complete decks in the hull there are therefore 14 compartments for cargo, 8 forward and 6 aft.

All cargo spaces are completely insulated with regranulated cork and the void spaces not filled by the latter are filled with cowhair. The entire cargo space is provided with air cooled refrigeration, the two sides of each compartment for its entire length being fitted with air ducts through which the cold air discharges at the bottom underneath the portable wood gratings which cover the entire deck area. The arrangement of the air ducts is an original one devised by H. H. Robson, of the United Fruit Co. and provides for an equable distribution of air throughout the length of each compartment. The system provides for close regulation of the air supply by means of adjustable louvres which are so located as to be readily accessible at any time. Provision is also made for the admission of fresh air as and when desired, and the escape of vitiated air. It is believed to be the largest and most completely equipped plant of its kind afloat, for that purpose.

Particular attention has also been given to the lighting of the refrigerated cargo spaces. Porcelain enameled steel parabolite type lighting fixtures, each with one 100-watt lamp, are mounted around all sides of each compartment, about 25 feet apart, and are set in heavy wood frames for protection against mechanical injury.

For the carriage of special refrigerated cargo, such as meats or other foodstuffs which require low temperatures, a separate compartment is provided at the after end of the main deck. This compartment is

fitted with air ducts at the sides the same as in the other cargo spaces and is thus available, as an integral part of No. 4 main 'tween decks, for the carriage of fruit. It is also fitted with cooling coils and when desired for special use it may be entirely insulated from the rest of the compartment and cooled by an entirely separate refrigerating plant, which is provided especially for it.

While the carriage of bananas is the principal cargo business and the ship is especially designed for that trade, such cargoes are only carried on the north bound trip. South bound the cargo carried is a general one, steel products being an important item. Complete facilities are therefore provided for handling miscellaneous cargo, and especially long hatches are fitted in the decks in No. 2 hold in order that rails and similar long units may be readily stowed. Each of the four main holds has a weather deck hatch which is served by two 5-ton booms, and at No. 2 hatch there is also a 30-ton boom for handling especially heavy items. All 5-ton booms are heeled on tables on the masts, and the 30-ton boom is heeled in a pedestal on the deck aft of the fore mast.

All booms are tubular and are served by motor-driven winches, two of which are fitted at each hatch. In addition to the main hatches there are two wing hatches fitted in the main deck in No. 2 and No. 3 holds. These are principally for use in the handling of bananas, the loading and unloading of which is done by means of portable conveyors. Each of the main 'tween deck compartments is also fitted with a double cargo port on each side of the vessel, and in addition single ports are fitted in No. 2 and No. 3.

For bulk mail and postal matter a special mail compartment is fitted on the starboard side of the main deck abreast the engine casing with direct access from the amidships ports. A strong room for the carriage of bullion is fitted in the mail room.

### Complete Refrigerating Machinery

The TALAMANCA and sister ships have three separate and entirely independent refrigerating plants, one for the air-cooled cargo space, one for the special cargo space, and one for ship's stores.

Refrigerating machinery for the main cargo is located immediately aft of the main engine room, under the orlop deck, the compressors and brine pump motors in the thrust recess and the rest of the plant in a water tight compartment aft thereof. This plant is a CO<sub>2</sub> compression, brine circulating type in three units, the individual members of which are driven by electric motors.

The refrigerating plant for the special cargo space is a semiautomatic, direct expansion, ammonia type, with a two-cylinder single acting compressor driven by an electric motor. It is located in a gas tight compartment on the main deck aft, adjoining the cargo space for which it is used.

For the ship's cold storage rooms and the main pantry refrigerators, there is a CO<sub>2</sub> plant located on the port side of the main deck, abreast the engine room. This plant consists of two motor-driven compressors, one brine cooler, two centrifugal brine circulating pumps, one condenser and one circulating water pump.

All refrigerating machinery was supplied by the York Ice Machinery Corp.

For circulating air in the refrigerated cargo spaces motor-driven fans are fitted in connection with the cooling units. Mechanical supply ventilation is provided for supplementary air for these fans.

### Mechanical Supply Ventilation

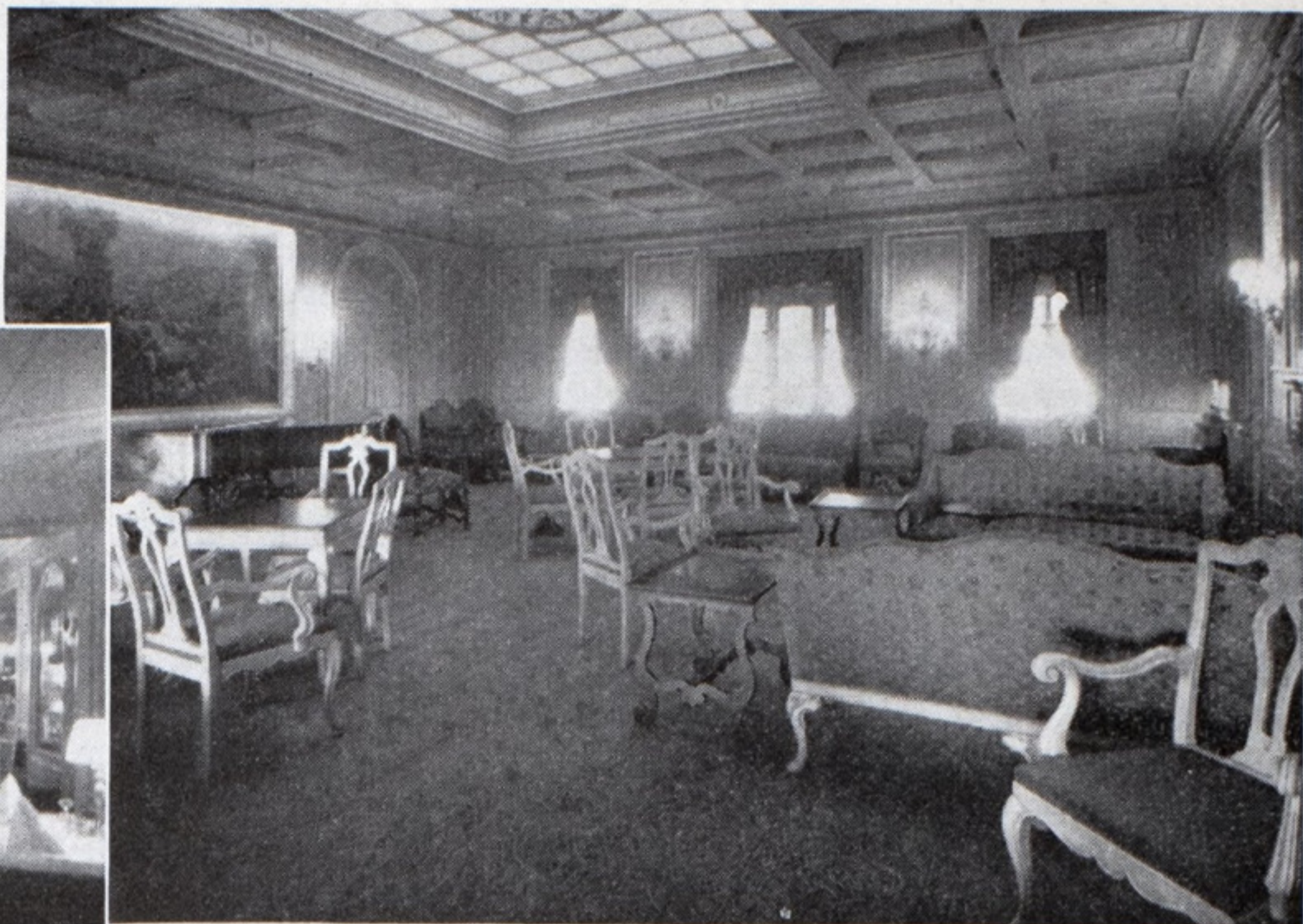
Each separate compartment of all machinery spaces, is provided with mechanical supply ventilation. An unusual feature is the fitting of such systems to the boiler room. For the latter two 10,000 c. f. h. fans of the American Blower Co.'s non-overloading type, located on the boat deck, are connected to the boiler room natural ventilation trunks, a damper being fitted in the latter below the cowl and above the fan connection. These fans ensure an adequate circulation of air in the boiler room when the vessel is in port, or operating under reduced power; under normal operations, in temperate climates, these fans are not used.

For the ventilation of the main engine room there are three separate supply systems, which also supply the refrigerating machinery room for ship's stores. A 750 c. f. m. exhaust fan is provided to eliminate the humidifying effect of the main turbine gland leak-offs. The main refrigerating machinery room aft of the engine room is provided with a separate supply system, and exhaust ventilation is provided for the refrigerating machinery room aft on the main deck.

A complete arrangement of mechanical ventilation is provided for all passenger and crew spaces, and for galleys, pantries, and storerooms. There are seven separate supply systems and four exhaust systems. Four of the supply systems have air heaters connected to the fans thus combining heating and ventilating for all passenger public spaces, all passenger staterooms, all officers' and engineers' quarters on boat deck, all crew's quarters and mess rooms



Above, Dining Room



Above, Music Room

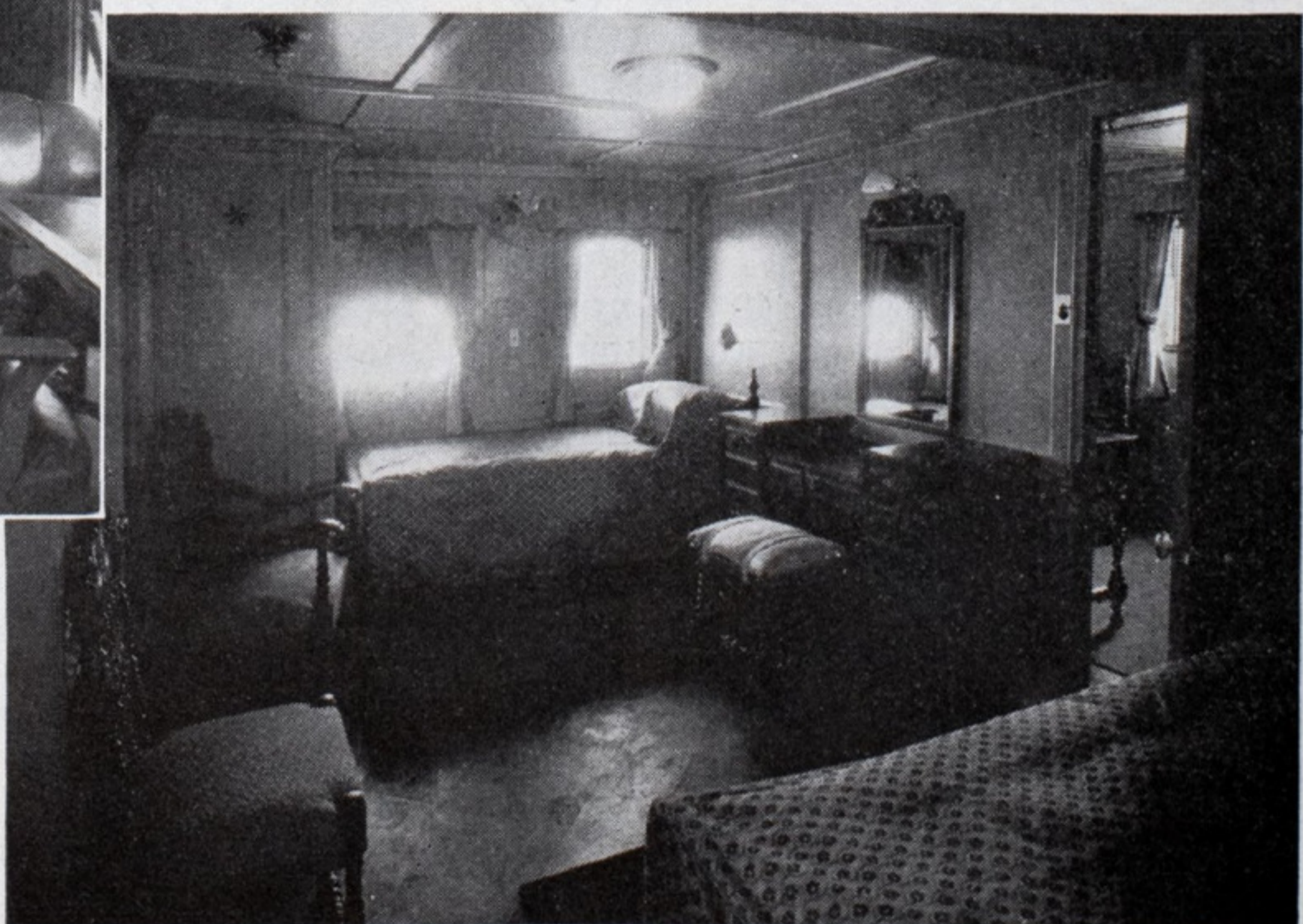
# S. S. Talamanca Public Rooms First Class



Above, Enclosed Promenade Deck



Above, Smoking Room



Right, Passenger Suite

amidships on upper deck, and to mail room, storerooms, and banana ripening room on the main deck.

For the crew's quarters and galley in the poop, and the crew's hospital, there are both supply and exhaust ventilating systems; no air heaters are fitted in the supply system to these spaces, all heating being done by steam radiators. The main galley and pantry spaces have their own special ventilating systems, one supply and one exhaust being provided for their exclusive use. The smoking room is provided with mechanical exhaust as well as with heated air supply. Exhaust ventilation is also provided for all bath, shower and toilet spaces, and for winch control rooms.

All fans and air heaters are American Blower Co.'s make and the fans

finished by the Lidgerwood Mfg. Co. They are of the reversible, single drum type, driven by General Electric 35 horsepower waterproof motors through double reduction spur gears having cut teeth. Solenoid-operated shoe brakes mounted on the winch bedplate are used for holding the load and to assist in stopping it. Complete magnetic control is provided with watertight master controllers mounted on the deck adjacent to the hatches and control panels and resistors mounted in control rooms below the weather deck. The controllers provide for speed control in both hoisting and lowering, and for dynamic braking in lowering and in the off position. A foot-operated hand brake is mounted on the drum flange for emergency use. One of the winches at No. 2 hatch has an addi-

with a solenoid-operated shoe brake, is located on the weather deck, and is capable of handling the two main bower anchors and their cables simultaneously.

Steering gear of the electrohydraulic type was supplied by the American Engineering Co. The double rams are 12 inches in diameter and are mounted forward of the rudder stock, with their axes athwartship. Each of the two pumping sets consists of a low pressure Hele-Shaw pump driven through a flexible coupling by a 30 horsepower motor, which is fitted with a solenoid-operated shoe brake, the brakes being fitted in order to permit operating either unit with the stop valves to the other unit open. The steering gear may be controlled from the pilot house by an American Engineering Co.'s hydraulic telemotor, or by a Sperry two-unit gyro-pilot. A trick wheel in the steering engine space is provided for local control, and there is also a steering stand on the docking bridge, which is connected to the trick wheel by shafting and gears.

For handling the life boats there are two motor-driven winches located on the boat deck, each with a 15 horsepower motor and provided with dynamic braking in the off and lowering positions. Four hoisting speeds and one lowering speed are provided.

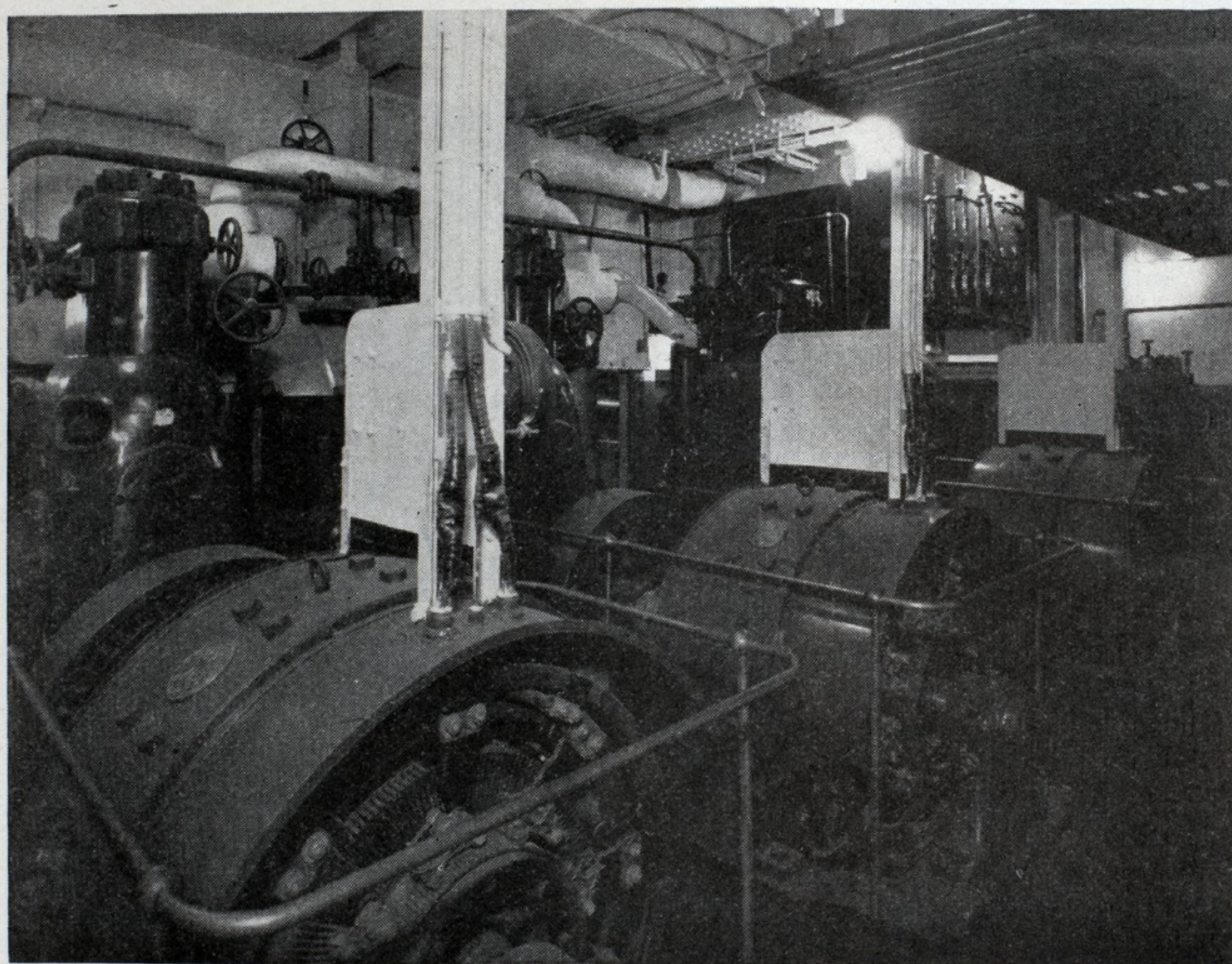
Each of the two accommodation ladders is handled by an electric hoist, furnished by American Engineering Co. The hoists are mounted on special davits, on which a push-button control station is also mounted. The controller is waterproof and is mounted on the hoist.

#### Life Saving and Other Equipment

Lifeboat capacity sufficient to accommodate the entire number of persons on board is provided in five 26-foot metallic lifeboats and one 26-foot motor lifeboat. All of these boats are built of Armco iron and were furnished by the C. M. Lane Lifeboat Co. The boats are handled by six sets of Lane mechanical davits, also furnished by that company.

Ground tackle is in excess of classification requirements and consists of Baldt stockless anchors and stud-link cables, all of which were furnished by the Baldt Anchor, Chain & Forge Co.

The very complete navigating outfit was furnished by T. S. and J. D. Negus and the Sperry Gyroscope Co. In addition to the customary magnetic compasses there is a complete Sperry gyroscopic compass system. A Sperry gyro-pilot, a radio direction-finder, and a fathometer furnished by the Submarine Signal Corp. are other modern navigational conveniences. Other special outfit includes two 18-inch Sperry searchlights, rudder angle indicators, Cum-



*Refrigerating machinery S. S. Talamanca. Compressors driven by electric motors*

are driven by General Electric motors.

All power auxiliary machinery throughout the vessel is electrically operated, General Electric motors being used throughout. Since the main propelling machinery is also electric, and the galley equipment is electrically operated, the vessel may rightly be termed an all-electric ship. The refrigerators in the crew's galley, beverage room, and lounge pantry, all are electric, and two electric water-cooling units on the bridge and promenade decks, provide ice water for passenger use. The electric refrigerators and water coolers are of General Electric type requiring alternating current for their operation and this is supplied by one of two central rotary converters located in the engine room at the operating level.

The eight cargo winches were fur-

ditional spur gear train which operates an extension shaft on which are fitted two warping heads whereby the winch may be used for warping purposes.

For warping purposes there are two reversible electric capstans forward and an electrically driven winch on the poop deck which may be used in connection with the emergency steering gear. Each capstan, and the warping winch, is driven by a 35 horsepower motor and is fitted with a solenoid brake for holding the load. Speed control in either direction is magnetic. Additional warping and mooring equipment, not in general use on American-built ships, are four Watson-Stillman wire rope nippers, of which two are located on the forecastle deck and two on the poop deck.

A Hyde windlass, driven by a 60 horsepower electric motor and fitted

mings revolution counters, and electric whistle and siren operators, as well as a complete radio telegraph equipment. An electrical clock system is provided, the master clock being located in the chart room.

The provisions for fire extinguishing include a Lux CO<sub>2</sub> system for the boiler room and one for the propulsion generators, and steam smothering pipes for the cargo holds. For fire detection in the latter the Rich fire detecting system is installed; and a Henschel 14 circuit alarm system with thermostats in each stateroom and other required spaces, and an annunciator in the wheel house, is installed for all living quarters.

### Turbine Electric Propulsion

The selection of turbine electric drive was based on very substantial grounds, the wide range of flexibility being a particularly desirable feature, while its comparative freedom from vibration lessens the danger of the bananas being damaged by abrasion. The heavy tropical rains which so often occur at the Central American ports at which the ships load, at times delay the loading of cargo, and it is therefore often necessary to make up as much as 8 hours on the northbound voyage in order not to miss the market. A large reserve of power is therefore needed without loss of efficiency, while at other times the ability to operate the two main motors with only one main generator running represents a large saving over other types.

The turbine electric equipment on these vessels includes two main turbo-generators which supply the power to the two main propulsion motors, one of which is fitted on each of the twin screw shafts. A Kingsbury main thrust bearing of the two-shoe type is fitted immediately aft of the main motor, and each shaft drives an outboard turning, solid bronze propeller, having three blades of air-foil section, a diameter of 15 feet 3 inches, and 17 feet 0-inch pitch. Each of the main turbines has 14 stages and a maximum rating of 5300 shaft horsepower at 3500 revolutions per minute, the corresponding rating for each main generator being 4200 kilowatts, 3150 volts, 3-phase, with a power factor of unity.

Each main generator set is designed for a steam pressure of 325 pounds at the throttle, 230 degrees Fahr. superheat, and a vacuum of 27.5 inches at the turbine exhaust casing with seawater at 85 degrees Fahr. The main generators are fitted with surface air coolers, one for each machine, and each cooler has two sections, each of which has 1660 square feet of cooling surface.

These main generating sets are located in the upper part of the engine room at about the lower deck level, with the control panel at the same level at the after end.

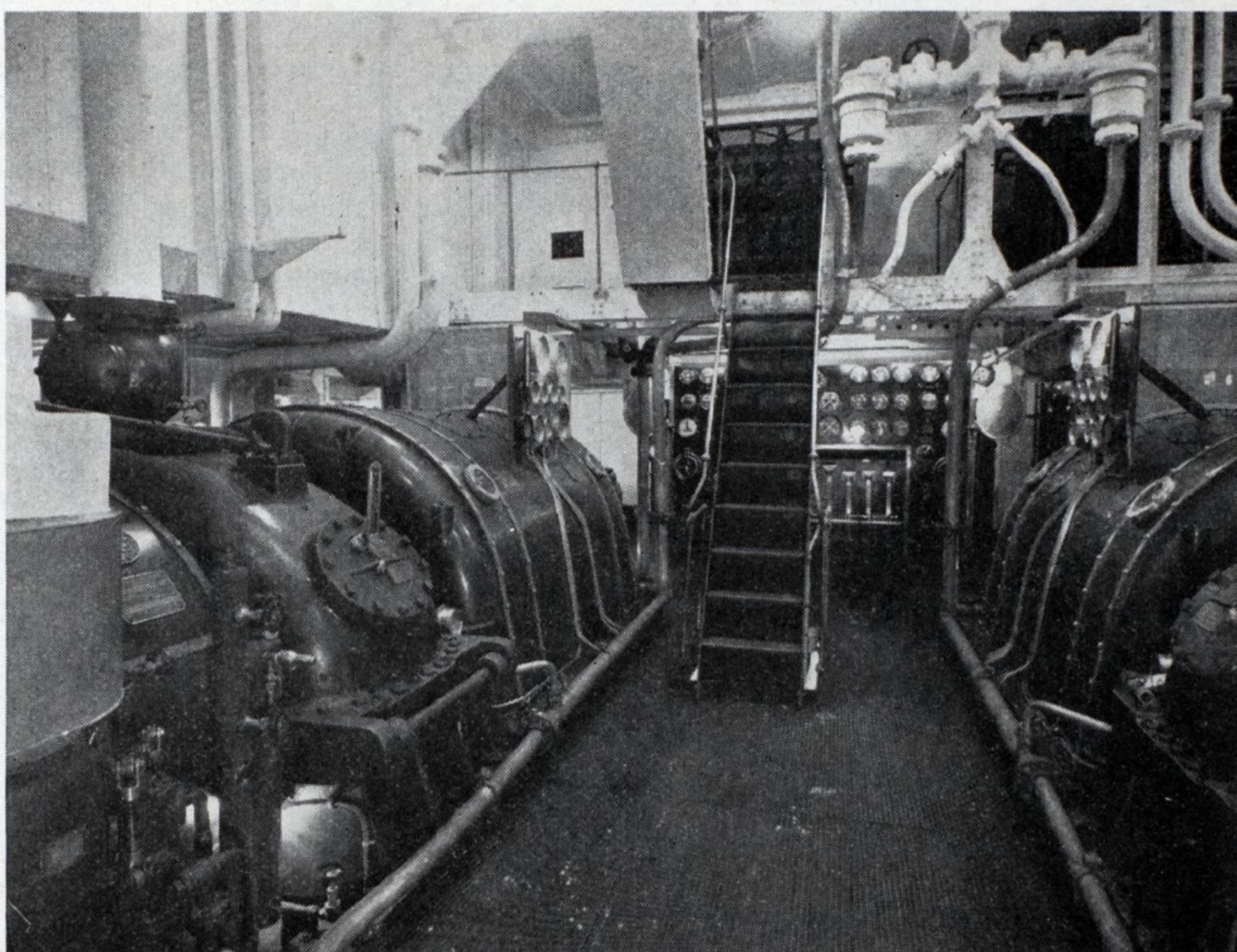
The two main propulsion motors

are of the synchronous-induction type, each having a maximum continuous rating of 4200 kilowatts at 125 revolutions per minute, 3150 volts, 3-phase. For each motor there is a power ventilating fan of a capacity of 14,000 cubic feet per minute driven by a 15 horsepower motor, and combined with these two fans is one surface air cooler, which has two sections each of which has 1950 square feet of cooling surface. This closed ventilating system is a distinct advance over the earlier types, since it excludes from the motor all steam or oily vapors which might otherwise be drawn from the engine room, and ensures cleanliness and longer life of the motor insulation.

In order to provide space in the lower engine room for these air cool-

500 square feet. To each condenser there are fitted two Wheeler two-stage tube jet air ejectors, either of which is capable of maintaining 28½ inches vacuum at full power. The main condensing equipment also includes three Warren horizontal centrifugal condensate pumps, each driven by a 10 brake horsepower motor, one for each condenser and one for reserve. Circulating water is provided by two Warren centrifugal pumps, each of 9000 gallons per minute capacity, and driven by an 82½ horsepower motor. The condenser on the port side is so connected as to be available for use with the auxiliary generator sets.

In addition to the main condensing plant there is an auxiliary condenser with a cooling surface of 2200 square feet. It is provided with



*Main engine room S. S. Talamanca. Two turbine generating sets*

ers, ducts, etc., the generator cables are brought out at the top of the generators and are run overhead into the top of the control cell, instead of coming out at the bottom and running under the machinery flat as has been the usual practice heretofore. Field rheostats for the propulsion motors and generators are also mounted overhead. The propulsion cables from the generators and to the motors are thus short and direct, minimizing losses and chances of trouble. The turbine generating sets and propulsion motors were furnished by the General Electric Co.

Each of the main generator turbines has its own surface condenser which is located underneath and directly attached to it. These condensers have welded steel plate shells and are of the two-pass type, each having a cooling surface of 16,-

a division plate in the water chest so that one half of the condenser may be cleaned while the other half is in use. This condenser is also equipped with two wheeler air ejectors, either of which is capable of maintaining 28½ inches of vacuum, and with two motor-driven Warren centrifugal condensate pumps, one of which is a standby. The circulating water pump for this outfit is a 3000 gallons per minute Warren centrifugal pump, driven by a 27½ horsepower motor.

The boiler plant consists of four Babcock and Wilcox standard marine type watertube boilers, located in one compartment with an athwartship fireroom. The boilers have a total heating surface of about 22,500 square feet, are fitted with inter-deck superheaters having a total heating surface of about 2250 square

*(Continued on Page 48)*

# Port Newark Seeks Parity in Rates in Metropolitan District

By Raymond J. Dempsey

**I**F PORT NEWARK is placed on the same level as the property occupied by the Bush terminal and docks in New York harbor, within the free lighterage limits, or if rates equitable to the geographical position that Newark occupies are approved, it is believed that the business to come will make Port Newark the shipping and industrial center of the metropolitan district.

For nearly two years, one of the most important railroad rate cases before the interstate commerce commission, has been in progress; first, in Newark, N. J., during the summer of 1930, and during 1931, in Boston, New York and Brooklyn. Briefs have been filed with the interstate commerce commission, during the week of Nov. 16, 1931, involving thousands of pages of evidence taken from testimony received in the cities above referred to.

It is now expected that in the early part of 1932, the examiners for the commission will have made their report, and those concerned will know the effect that this report to the commission, which as a rule is confirmed by the commission, will have on the affected areas.

The city of Newark is comprised of some 15,000 acres, and of this approximately 20 per cent is located in the meadow district on the

The author of this article, Raymond J. Dempsey, is port superintendent of Port Newark.

southeasterly side of the city. Of the balance, 80 per cent, or 12,000 acres, has been developed almost 95 per cent of its maximum, either for residential, business or industrial purposes.

Exhibits were produced and filed in the lighterage case, showing the nature of New York's advantage and New Jersey's disadvantage, as disclosed in the assessed valuation of water front property. The assessed valuation of New York's water front averages \$152,418 per acre, and that of New Jersey's water front \$28,341 per acre. Port Newark is not included in this valuation, but an estimate of the lands developed and in use at present, places its value on the same level as that averaged for the Hudson river waterfront on the New Jersey side.

## Ample Room for Expansion

Of the 2600 acres owned by the city, 500 acres has been allocated for airport purposes. There is 133 acres sold to the United States government, known as the Army Supply base, and together with the land that has been used for the inshore channel, streets, etc., it is estimated that there is approximately 1300 acres available for industrial and shipping purposes. Based on the assessments made on the water front in New York harbor, it is fair to assume that in anticipation of a ruling, that will benefit the port of Newark, it will cause this property to be worth an average of at least \$50,000 an acre, within five years, or a total of \$65,000,000 for less than 50 per cent of Newark's meadow holdings.

In the testimony given by Mayor J. T. Congleton at the lighterage hearing in Newark last year, he said: "Newark's shipping interests have a natural advantage of location, but that advantage is neutralized by the freight rate structures which provide equal rates to and from their competitors in New York. We request the interstate commerce commission to establish rates on the freight, that are lower than the rates which cover lighterage service performed within the free lighterage limits of the harbor."

The brief filed by the Port of New York authority contains the following evidence, supporting New Jersey's contention that the rates are

discriminatory, and that port unity does not exist, when lighterage service as performed by the trunk lines, is not applied to all parts of the harbor. Port Newark does not enjoy this free marine service, but when her shippers find it necessary to use lighterage, they are called upon to pay for same. On the other hand, Port Newark, because of its geographical position, is able to save the carriers an average of \$2.75 per ton, that it costs them to perform this marine service.

## What N. Y. Port Authority Says

"The Port authority is not unaware that there are certain discriminations now existing which impair the unity of the port district and which must be eliminated in order to make the rate structure fair and reasonable and in conformity with the principles of rate grouping. The joint efforts of the Port authority and the communities and industries in New Jersey, which are suffering from the discriminations have failed to bring complete relief. Because of the importance of this matter, we are setting forth below some of the major instances in which, in the opinion of the Port authority, New Jersey is suffering from manifestly unfair treatment.

"The lighterage limits of New York harbor are not logical. Very important parts of the New York port group have been excluded. This



Jerome T. Congleton



James W. Costello

is particularly true of Port Newark. Under the principles of port grouping clearly established by the commission, there is no possible justification for an arbitrary delimitation of the lighterage limits which excludes important parts of the harbor area from lighterage or equivalent switching service."

In the brief filed by the state of New Jersey, the attention of the commission was called to the freight rate structures, restraining the normal growth and development of commerce at Port Newark, and it was pointed out that Newark had provided and constructed facilities suitable for direct transfer of freight between steamers and railroad cars, which its competitors at Manhattan and Brooklyn cannot provide at normal or reasonable cost. The cost of such transfer at Port Newark of general merchandise, exclusive of cost of switching service, is approximately 50 cents per ton, and the cost of such transfer at Manhattan and Brooklyn, exclusive of cost of switching is \$2.75 per ton. Such higher costs at the latter places, are due to the expensive lighterage service.

The difference between these costs should go to the shipper, but the railroads insist on pocketing the savings, and say that the rates covering the direct transfer of freight at Port Newark are of the same measure and level as freight rates within the free lighterage limits of New York harbor, where lighterage costs raise the cost of transfer to the \$2.75 figure quoted.

#### Should Treat All Sections Alike

New Jersey, further in the brief, states, "That, if the defendants can justify their performance of free lighterage in any part of the port, the complainant (New Jersey) respectfully requests that they be required to perform free lighterage in all of the New Jersey part of the port." This appears to be a most reasonable request, and certainly one that New Jersey is entitled to. It should be remembered, however, that the basis of our complaint is that our state is entitled to lower rates and that finally the commission should make further and additional findings that will afford all of the relief that the complainant is entitled to.

Considering the obstacles that the port has encountered during the ten-year period since the war, it is worth mentioning at this time, a resume of the business that has been developed and carried on, during this period when a great depression in commerce was prevailing throughout the world.

A successful port development should not be judged entirely by the direct revenue that is obtained through its development, but the indirect benefits that accrue, should be considered. A great many ports

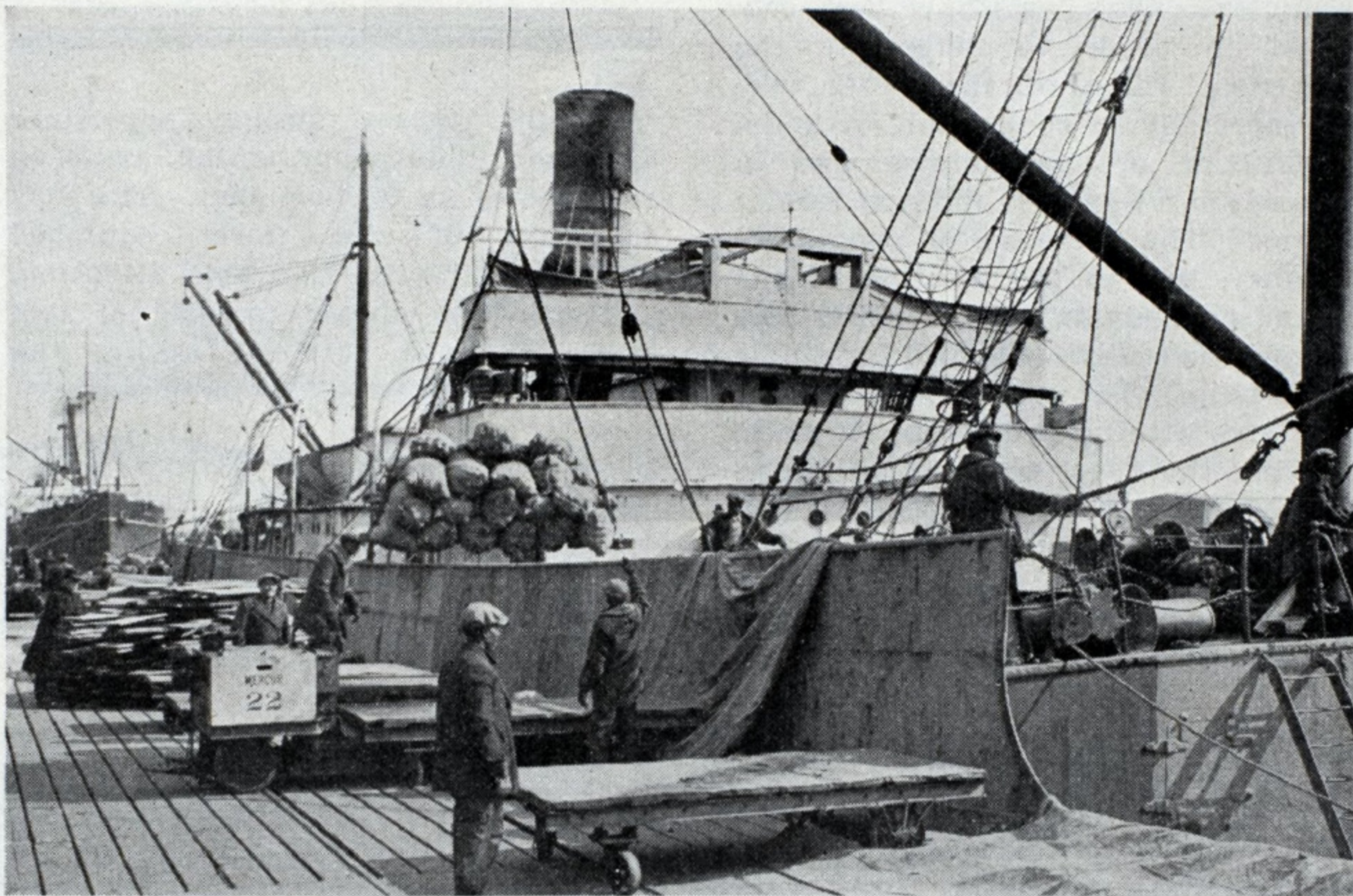
throughout the world are considered by the municipality or state, more or less, as a subsidy. The war department spends approximately \$150,000,000 to \$200,000,000 in the maintenance of harbors and waterways. Directly, no return is received by the war department because of this. Indirect benefits, however, go to the country through custom receipts and other returns.

During the past ten years there has been an average of more than 200 ships a year arriving or leaving the port, carrying more than 1,000,000 tons of cargo each year. This cargo had a value of more than \$40,000,000. It was necessary to employ a great number of men to handle this tonnage, and our records show over a ten year span, that an average of over 2000 men per year were employed at the port. This

erage of several thousand steamers a year arriving and departing from the Port Newark docks, with more than 10,000,000 tons of cargo, having an annual value of more than \$400,000,000. The railroads will benefit through this business, by having an average of 90,000 loaded railroad cars moving to and from this great development each year. The trucking industry would also be benefited in a like degree.

More important than all these factors mentioned previously, would be the employment that this business would require. It is fair to assume that within a ten-year period, 15,000 to 20,000 employes will be working at the port during an average year, requiring payrolls amounting to \$30,000,000 a year.

During the past ten-year period the city has received directly \$1,200,-



*Discharging potatoes at Port Newark. During the past four years 1,403,787 bags have been unloaded and stored*

employment also meant payrolls of \$3,000,000 per year.

The railroads benefited through this business by an average of more than 10,000 loaded railroad cars moving in and out of the port, carrying more than 250,000 tons of merchandise each year. Trucking interests also had a part in the business, as our records indicate that an average for five years show that more than 67,000 loaded trucks a year moved a portion of this business, or more than 450,000 tons, average each year. During the last five years a total of more than 1,600,000,000 board feet of lumber arrived at the port from the West coast.

#### With Parity Will Come Expansion

What will this mean to Newark? Based on the figures just cited, it is fair to expect that at the end of the next ten years, we will have an av-

000 in revenue from its tenants and docks located at the port. This does not include the \$1,300,000 received from the United States government for the sale of 133 acres used by the war department for the construction of the Army base. By the end of 1941, revenues being derived from piers, leases or sales for industrial sites, and through other sources, it is anticipated will total for this next ten-year in excess of \$12,000,000.

The policy that has been followed by those in charge of the development up to the present—Mayor Raymond, Mayor Congleton and Chief Engineer Costello—has been to hold this property and to lease same. If this policy is to be continued, it is the opinion of water front specialists and real estate experts that the Port Newark development, because of the increase in value that is bound to occur, will make it the greatest asset the city has ever had.

# Rudder Efficiency in Modern Design

## The Oertz Rudder

By L. van den Honert and J. H. Clark

THE Oertz rudder was invented by Dr. Max Oertz of Hamburg, who applied his wide experience in aerodynamics to shipbuilding. In 1925 the first Oertz rudder was installed and demonstrated the improvements which could be made in the efficiency of vessels through application of the principles of aerodynamics. Up to the present, nearly 1000 Oertz rudders have been installed, without change in the fundamental principles of construction.

Numerous tank tests have been conducted in order to determine the theoretical value of the Oertz rudder, especially in connection with the construction of new tonnage and in comparison with other modern rudder designs. The increase in propulsive efficiency, due to the location of the streamline body in the propeller slip stream, was easily confirmed for single screw ships, but required elaborate tank tests with up-to-date apparatus in studying the effect for modern superliners. The increase in speed as well as the improvement in maneuverability have been investigated, with the result that, for instance, the streamline balanced rudder, designed for the

THIS is a second of a series of three articles on modern types of rudders. The first article, on the Simplex rudder, appeared in the December issue. The third article, on the Contra rudder, will appear in the February issue.

Editor's Note

quadruple screw Italian superliner REX, now under construction, has been replaced by an Oertz rudder. The easy handling of the Oertz equipped BREMEN attracted favorable attention.

The Oertz rudder consists of two parts, a fixed forepart taking the

place of the old fashioned square rudder post, and a movable after part, so arranged that the two parts together have a streamline form in mid-ship position. When the rudder is given helm the cross-section will be very similar to the wing profiles of airplanes, a so-called aerofoil, as shown in the drawing, Fig. 1, of an Oertz rudder at a slight angle.

The effect of this rudder on the ship's efficiency may be divided into four separate objectives:

- a. Great stability of the ship's course.
- b. Greatly reduced turning radius.
- c. Reduction of the rudder resistance to a minimum.
- d. Increase of the propeller efficiency.

At first sight it would seem difficult for any one rudder to fill the requirements under both a. and b.

However, the fact that the streamline shape straightens out the eddies set up by the propeller and forces the water to follow snugly the sides of the rudder, will explain why the rudder exercises a steering action even in mid-ship position, keeping the vessel on her course and, moreover, creates a considerable rudder effort even at very small rudder angles, leaving no room for the "dead angle," well known to all who have watched the steering of a ship with an ordinary plate rudder. The rudder side force is considerably increased and a turning radius of from 1 to 2 ship lengths at full speed is customary. At the same time the rudder torque is decreased. The torque is reduced by about 50 per cent, due to the fact that a major part of the side force is produced by the fixed forepart of the rudder which of course cannot cause any torque in the rudder stock. It is common practice to reduce the steering engine for Oertz rudders to 70 per cent of the power previously required. Balanced rudders may need a still smaller, steering engine, but here are important advantages to the Oertz rudder on account of the steadiness of course and the small angles nec-



Fig. 1—Cross Section of Typical Oertz Rudder at Small Angle of Helm

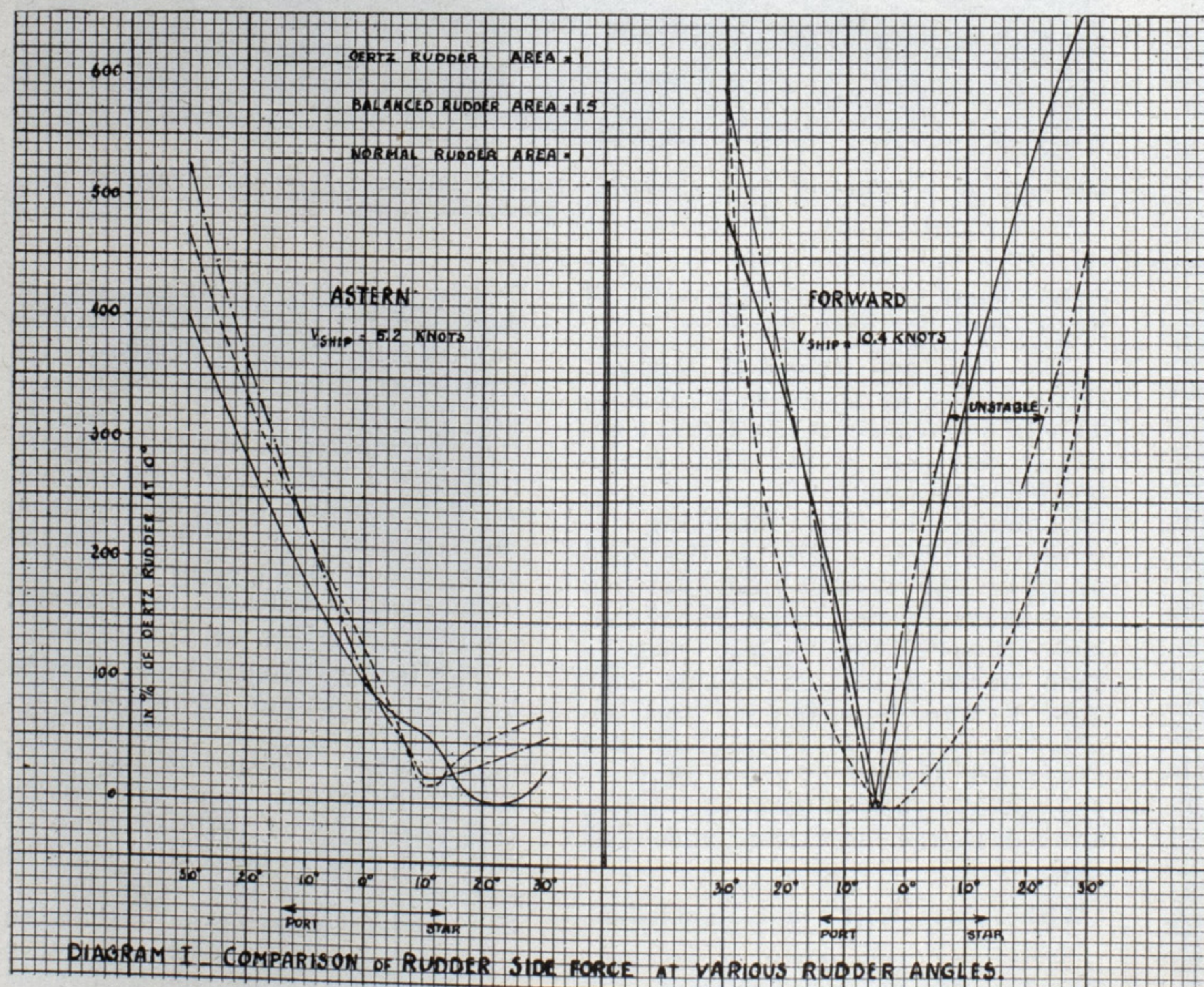


Fig. 2—Curves of Side Force on Oertz and Two Other Types of Rudders at Various Angles of Helm

essary for steering and maneuvering which directly reduce the power required for the same speed or increase the speed for the same power.

Figs. 2 and 3 show diagrams of the side force and the torque for three different rudders. The full lines represent the Oertz rudder, the dotted lines the ordinary plate rudder of equal area and the dash-dot lines a balanced rudder with same contour as the Oertz rudder. The area of the balanced rudder is equal to that of the rudder proper and nose together of the Oertz rudder and therefore is 1.5 times the area of the other rudders.

The size of the steering engine with a balanced rudder is usually determined by the maximum requirements when backing at half speed and it will be seen that no great difference exists between this and the maximum for the Oertz rudder, going forward at full speed. Fig. 3. On the other hand, the danger of unstable action is present if rudders are highly balanced, as in this case, as will be seen from Fig. 2. At 10 degrees starboard the action is irregular, causing vibration and unsteadiness of course.

An Oertz rudder about 10 times the size of a plate rudder, causes equal resistance, so that the resistance of this type of rudder of equal or even somewhat smaller area, as is standard practice, will cause less than 1/10 of the resistance of the slightly larger plate rudder.

The property of increasing the propeller efficiency is a more intricate problem. Recent research has proved that a stationary guiding fin arranged in a plane through the axis of the propeller has a favorable influence on the propeller efficiency. Sometimes special shapes are developed but it is found that fins with straight vertical, and therefore symmetrical, generating lines have the advantage of being useful at any speed and as well going ahead as going astern. Fig. 4 shows diagrammatically the horsepower required to drive a vessel at a certain speed, at various angles of helm, for the three rudders described. For the balanced rudder, having the same contour as the Oertz rudder, the horsepower in midship position is the same, but as soon as helm is given the balanced rudder requires more power and this increase grows rapidly as the helm angle becomes larger. There is an increase in the ship's speed if an Oertz rudder is fitted. Compared with the ordinary plate rudder, a saving of from 12 to 20 per cent in power is obtained. These figures are corroborated by the actual results when plate

rudders are converted, the saving in fuel consumption offsetting inside of one year the cost of installing the Oertz rudder.

### Practical Results in Service

The results obtained in actual service correspond with those indicated by tank tests. 1. It will be found that the vessel's speed increases with unchanged revolutions per minute due to reduction in slip, and also that the fuel consumption is decreased due to the higher propeller efficiency. The

## Results for 7000-ton Vessel

Table I

Comparison at the Same Revolutions			
Rudder	I. H. P.	Speed	R. P. M.
Original.....	3820	14.77	95
Oertz.....	3597	15.05	95
Original.....	4380	15.41	100
Oertz.....	4170	15.72	100
Comparison at the Same Horsepower			
Rudder	Speed	R. P. M.	I. H. P.
Original.....	14.97	96.6	4000
Oertz.....	15.55	98.5	4000
Comparison at the Same Speeds			
Rudder	I. H. P.	R. P. M.	Speed
Original.....	4030	96.8	15
Oertz.....	3440	93.6	15
Original.....	4948	104.7	16
Oertz.....	4472	102.5	16

Note: I. H. P. (indicated horsepower); R.P.M. (revolutions per minute); Speed (knots)

data in Table 1 give the trial results of a new 7000-ton vessel which had the original plate rudder changed to an Oertz rudder only three months after entering service. Conditions during both standardization trials were

identical according to reports.

Figures given in Table 1 clearly show the superiority of the Oertz rudder over the plate rudder. Many other standardization trials and operating results covering months of actual service show equal or even better results as far as the increase in propulsive efficiency is concerned.

Improvement in course stability and better maneuvering qualities of the vessel are immediately recognized by all captains of Oertz equipped vessels. The rudder remains for long periods in the same position and if the ship falls off, only a slight rudder angle will suffice to bring her back on her course.

On the Great Lakes where many balanced rudders have been converted into Oertz, owners and captains unanimously agree that the ship handles better. The good qualities are specially demonstrated under extraordinary conditions; that the ship will handle perfectly even with the engines stopped has proved of great value. Pilots of the Panama, Suez and Manchester Ship canal report on the easy handling of even the biggest ships when passing through the canals. Great Lakes navigation is largely in pilot waters—narrow and shallow channels, crowded harbors and large underpowered ships. One of many instances is that of the captain of the 18,000-ton motorship HENRY FORD II who reported that he was able to break the bank suction without increasing speed when navigating the River Rouge with only one foot of water left under the bottom, a feat that he never be-

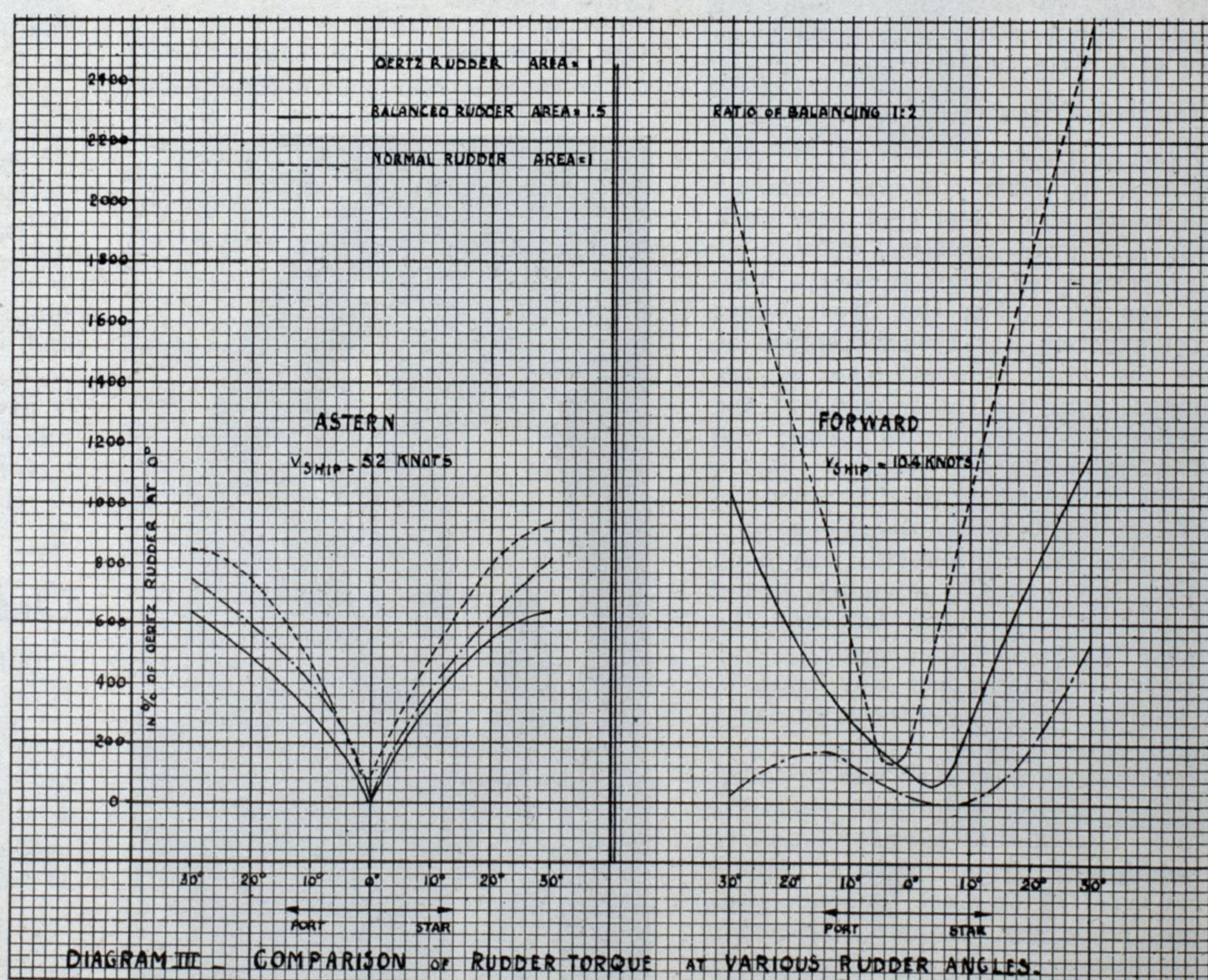


Fig. 3—Curves of Torque for Oertz and Two Other Types of Rudders at Various Angles of Helm

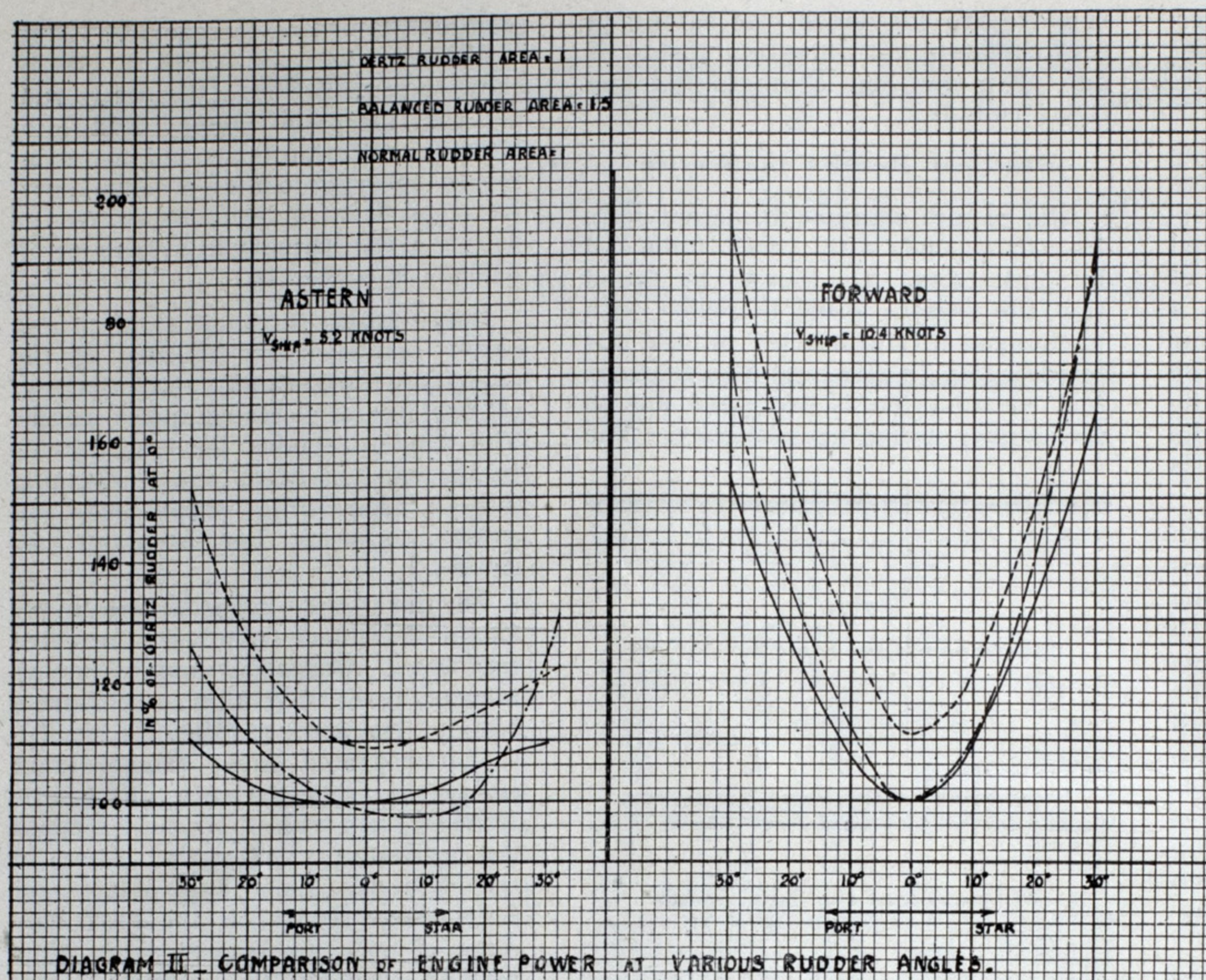


Fig. 4—Curves of Engine Horsepower for Driving Vessel at a Certain Speed for Oertz and Two Other Types of Rudders at Various Angles of Helm

fore had been able to accomplish with the double plate balanced rudder.

The great thickness of the Oertz rudder makes for great strength of the rudder appendage. The fixed part, built up from plates and angles, is much stronger than the ordinary cast steel rudder post. New rudders usually have only two large pintles and the weight is approximately the same as that of a plate rudder.

#### Practical Features of Construction

Existing rudders can easily be converted into Oertz rudders. The actual construction has kept pace with modern shipyard practice, welding being incorporated where formerly riveting was used. For the Great Lakes a construction has been developed so that the fixed forepart can be unshipped, enabling the removal of the propeller while tipping the vessel and thus eliminating dry docking. When, recently, a vessel with this construction had to fill her outboard bearing, the whole job of removing the fixed rudder part and the propeller, filling the bearing and again installing the removed parts, was done easily in time to have the ship on her way again in 24 hours. Fig. 5 illustrates an Oertz rudder conversion.

The first Oertz rudder was installed in 1925 and at the present time 972 vessels, aggregating 4,700,000 tons, are so equipped. These vessels include every type: 20-ton craft, tugboats, pilot boats, freighters, tankers, passenger ships, destroyers and superliners such as the BREMEN and REX; illustrating the wide range adaptable for this type of rudder. Many fleets are equipped;

a partial list follows:

Name of Company	No. of Ships
North German Lloyd.....	78
Royal Dutch S. S. Co.....	49
S. S. Co. Nederland.....	31
Osaka Shosen K. K. ....	36
Mitsui Bussan K. K. ....	27
Messageries Maritimes .....	20
U. S. Shipping Board .....	10
Standard Oil Companies.....	8
Lykes Brothers .....	7
Interlake S. S. Co. ....	10
Ford Motor Co. ....	4

The Oertz rudder is undoubtedly one



Fig. 5—An Oertz Rudder Conversion

of the major developments of the post-war period in naval architecture. Its further adoption on a much more extensive scale appears inevitable in the light of the recognized need for higher speed in water transportation.

## Propulsive Resistance

Under date of Sept. 8, 1931 the United States patent office awarded patent number 1,822,223 to Johann Rudolf Klinger of Nord-Bohmen, Czechoslovakia for an invention in construction of ships. This is a unique device. Generally, it is the purpose of this invention to relieve some of the resistance opposed to the movement of a ship through the water by blowing out under pressure air gas or gas mixture or mixture of air and gas or gases through pipes or pipe-like structures suitably arranged in front of the vessel. The object of this device is to disperse solid water confronting the

motion of the vessel and by thus relieving resistance to increase speed or reduce power. A British patent is said also to have been granted the inventor, its number being 299,727 and the date Nov. 7, 1929. The inventor suggests the importance of his scheme by the great increase in speed possible at minimum power and consequent economy.

Eastern Steamship lines have declared a quarterly dividend of 25 cents on the common stock, payable Jan. 2 to stock of record on Dec. 18, thus putting the stock on a \$1 dividend basis. Three months ago the company paid 37½c on the common and prior to that time it had been on a \$2 basis. The regular quarterly dividend of \$1.75 on the first preferred and 87½ cents on the preferred was declared, payable Jan. 2 to stock of record Dec. 18.

## Order Cutless Bearings

Cutless rubber bearings manufactured by the B. F. Goodrich Rubber Co. are specified for the United States coast guard cutter No. 55 to be built for the government by the Defoe Boat & Motor Works, Bay City, Mich. The propeller shaft will be mounted in an 11-inch bearing.

John Anderson, assistant to J. G. Barry, vice president, has been appointed secretary of the sales committee of the General Electric Co.

## Discuss Mail Compensation for American Ships

A meeting was held Dec. 7 of the national standing committee on the merchant marine, composed of shipping men representing all branches of the industry. This committee was an outgrowth of the fourth national conference on the merchant marine held last January. The meeting Dec. 7 will be the last to be held prior to the assembling of the fifth national conference, the date of which was tentatively set by the committee to be held in Washington on Jan. 27, 28, 1932.

The discussion centered around reports of subcommittees and such outstanding subjects as providing aid to types of ships not entitled under the law to compensation for the carriage of ocean mail, further regulation of water carriers in interstate commerce, codification of navigation laws, replacement of obsolete tonnage, provision for putting into effect the naval reserve act, foreign competition in indirect trade, and continued use of marine hospitals for sea personnel.

Those attending the meeting today were: T. V. O'Connor, chairman, United States shipping board; H. B. Walker, president, American Steamship Owner's association; H. Gerrish Smith, president, National Council of American Shipbuilders; George A. Marr, vice president, Lake Carrier's association; Robert C. Tuttle, manager, marine department, Atlantic Refining Co.; Malcolm M. Stewart, chairman, middle West Foreign Trade committee; Capt. W. J. Peterson, representing J. C. Rohlf's, president, Pacific American Owners association.

Captain John Donnelly, long renowned for wrecking operations on the Great Lakes and the St. Lawrence river, died suddenly at his home in Kingston, Ont., on Dec. 11 of a heart attack.

Captain Donnelly was born in Garden Island, Ont., in 1858.

## Propeller Club Convenes

At the annual convention of the Propeller Club of the United States held in Tampa, Fla., on Nov. 30, Arthur M. Tode, vice president of the New York Propeller club, was elected national president to succeed Harry W. Parsons of New York, who was made chairman of the board of governors. John Sonderman, president of the port of Baltimore, was elected vice president; J. A. Erickson, New York, treasurer, and Harold J. Harding, New York, secretary.

The main business session consisted of a complete revision of the constitution and by-laws, to be submitted to the member clubs for ratification. The changes made were radical with

the express purpose of simplifying the action of the governing body in administering the affairs of the club. Delegates spoke on the work of their clubs in various ports. An address on the American merchant marine by Chairman T. V. O'Connor of the United States shipping board was read by F. L. Judd in the absence of Mr. O'Connor.

The next annual convention will be held in Hampton Roads, Va.

## Stop Work on Cunarder

Plans are being discussed for the resumption of work upon the new giant Cunard liner building at the John Brown shipyard at Clydebank, construction of which was temporarily abandoned on Dec. 12 when 3000 workmen were dismissed. The Cunard line, for the first time in many years, has been unable to earn enough to cover depreciation of old ships. It is the traditional policy of shipping companies to finance the building of new vessels by drawing from the depreciation fund. Some private offers of aid have already been received by the company but these have not been of sufficient size and the principal hope of resumption of work rests on the possibility of temporary aid from the government. Millions have already been spent on the new \$30,000,000 liner and it was expected that she would be launched in May, 1932, and would enter the New York-Southampton run in the summer of 1933.

At a recent meeting in Paris of the directors of the Suez Canal Co. it was voted to reduce the transit dues by 10 per cent. The decision is believed to have been made following the diversion of the ships of several steamship companies to avoid dues which were called excessive.

## Materials Handling

At a meeting held in Cleveland Dec. 8, attended by over 70 representatives of materials handling equipment manufacturers, an organization to be known as Materials Handling institute was formed, the object of the association being primarily educational to promote a more intense mechanical handling consciousness in the minds of industrial executives and also to promote better understanding of the relationship in a co-operative way between the various groups.

The following officers were chosen: F. E. Moore, Mathews Conveyor Co., president; J. B. Webb, J. B. Webb Co., vice president; H. W. Standert, Northern Engineering Works, treasurer, and J. A. Cronin, Materials Handling & Distribution, secretary.

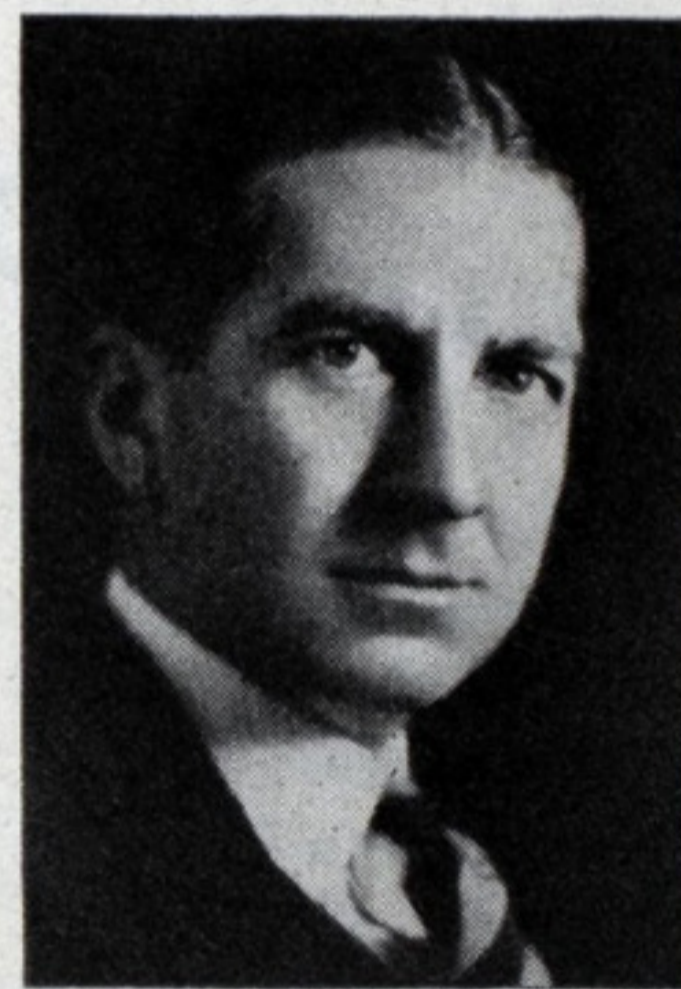
## Baltimore Mail Line Is to Extend Its Service

The Baltimore Mail line will in the future carry general cargo to Havre which formerly was a port of call for passengers. There will be a ship arriving from Baltimore and Hampton Roads in Havre every Saturday and a sailing from Havre every Sunday, west bound. Prior to arriving at a decision to carry general cargo regularly to the French port, there had been demands for this service from American shippers and several large cargoes of apples had been carried to Havre on a trial basis.

The adding of this freight service to Havre rounds out the Baltimore Mail line's service as now all four ports—Baltimore, Hampton Roads, Havre and Hamburg will be served alike with freight and passenger service.

## Sperry Staff Promotions

**A** NNOUNCEMENT was made recently by R. E. Gillmor, vice president and general manager of Sperry Gyroscope Co. Inc., that Robert B. Lea has been appointed sales



Robert B. Lea

manager of that company. Mr. Lea joined the Sperry company immediately after leaving Cornell university in 1915 and through his long connection with the organization has acquired a wide acquaintance in the marine field.

He was appointed assistant sales manager in 1927, continuing also at that time as manager of the marine department. His experience embraces various departments of the company. O. B. Whitaker, who has been assistant manager of the marine department since Nov. 18, 1930, succeeds Mr. Lea as head of that department. Mr. Whitaker has been with the Sperry company since



O. B. Whitaker

1913 and has been engaged in various departments, having helped to organize the service and inspection departments, the Gyro school and sales for marine equipment generally.

## Joins United States Lines

R. M. Hicks, for the last seven years assistant treasurer of the Merchant Fleet Corp., has resigned from government service to take a similar position with the newly organized United States Lines Co. He will be succeeded in the Fleet corporation by C. D. Gibbons, who has been assistant distributing officer of the shipping board.

## Heads Fairbanks, Morse

Robert H. Morse, formerly vice chairman of the board of directors of Fairbanks, Morse & Co., Chicago, has been elected president and general manager to succeed W. S. Hovey who resigned Dec. 1.

Mr. Morse was born in Chicago Dec. 6, 1878 and in 1895 entered the employ of Fairbanks, Morse & Co., the firm founded by his father, C. H. Morse. He began his career as an apprentice at the Beloit factory (then known as Fairbanks-Morse Mfg. Co.) and, except during his military service, has been with the company continuously since that time. In the 36 years he has been employed in various positions as salesman, department manager,

branch house manager, sales manager, president of the manufacturing division, vice president in charge of purchases, first vice president, vice



Robert H. Morse

chairman of the board and now president and general manager.

Mr. Morse is also a director of E. & T. Fairbanks & Co.

## Admiral Magruder Retires

At a fitting ceremony held before the personnel of the naval station at Algiers, La., Rear Admiral Thomas Pickett Magruder retired from a long and meritorious career in the navy, a veteran of 40 years' service. He began his service with the Spanish-American war, being on the ship that fired the first shot and was given the congressional medal of honor for cutting the cable at Cienfuegos in open boats under fire. He is a native of Yazoo county, Mississippi.

Ernst Glaessel and Adolph Stadtlaender have been elected chairman and vice chairman, respectively, of the board of management of the North German Lloyd. This fills the vacancy created by the death of Carl J. Stimming, director general.

Both Mr. Glaessel and Mr. Stadtlaender are well known to New York shipping men, as they frequently visit the United States.

Edwin A. Lawley, one of the founders and a director of the George Lawley & Sons Co., yacht builders at Naponset, Mass., died at his home in South Boston on Nov. 23.

# Coast Guard Patrol Boats Nearing Completion

THE accompanying illustration shows a view of the coast guard patrol boats THETIS and AURORA, each one of a group of seven which are approaching completion at the plant of the Bath Iron Works Corp., Bath, Me.

Particulars of these vessels are as follows:

Length, overall, feet, inches....	165-0
Length, load line, ft. in.....	160-9
Beam, molded, feet, inches.....	25-3
Depth, molded, feet, inches.....	13-2
Mean draft on trial, ft. in.....	7-6
Trial displacement, tons.....	332
Speed on Rockland mile, knots	16.5

These vessels are propelled by two 6-cylinder, Winton, solid injection type, diesel engines, 14-inch bore, 16-inch stroke, designed revolutions 450, revolutions on trial 475, injection

pressure 7000 pounds. Total shaft horsepower 1300 driving twin screws.

Auxiliary power is furnished by two 3-cylinder Winton, diesel generating sets 15 kilowatt capacity, engines 5-inch bore x 7-inch stroke. There is also one combination auxiliary generating set and air compressor 5 kilowatt capacity. There are two independent auxiliary air compressors, Winton model 177 and Winton model 185.

These vessels are equipped with twin rudders, proved to be excellent sea boats, handled well, and turn quickly.

Unusually comfortable quarters for officers and crew have been provided.

Machinery arrangement in the en-

gine-room is unusually well done and from an operating standpoint leaves little to be desired.

A noticeable feature on the trials was a steadiness and absence of vibration.

The bids for the construction of these vessels were opened Jan. 5, 1931. The contract was awarded the Bath Iron Works Jan. 9, each vessel to cost \$195,000, making a total of \$1,365,000 for the seven. The bid of the Bath Iron Works was the lowest of 13. Under terms of the contract, the first boat was to be completed and delivered not more than 300 days after date of receipt of notice to proceed, subsequent boats to be completed and delivered at intervals of not more than 25 days.



Two coast guard patrol boats Aurora and Thetis nearing completion at Bath Iron Works, Bath, Me.

# Electricity Put to Greater Use in New Ships During 1931

By D. W. Niven

**E**LECTRICAL marine power advanced to an important position during the year and the movement became more world-wide in its scope. In addition to the large number of turbine electric drive ships either commissioned or nearing completion in the United States, a number of important ships were either placed in service or at the fitting out docks in England, and work started on a super liner in France. The total horsepower installed and in process of construction, since the beginning of turbine electric drive, passed the 1,000,000 mark during the year.

In viewing the future trend with respect to large passenger ship applications it becomes evident that turbine electric drive will play a much larger part in the future than in the past. The diversified activities and requirements of such vessels, which includes seasonal changes of speed, alteration of speed between various legs of a journey, and the employment on cruising and excursion duty, emphasizes the need for a power plant having the widest degree of flexibility. Many of the foregoing services require but a fraction of the total installed horsepower capacity, and the ability of turbine electric drive to operate all propeller shafts under such conditions, with part of the main power plants and attendant auxiliaries shut down is a feature not obtainable with other forms of drive.

The diesel electric form of drive, because of its large field of application to harbor and inland waterway craft, was influenced by general business conditions. Except for the completion of tonnage or projects carried over from the year previous, there was little of what may be termed new business. Recent surveys made as to the age, inadequacy and obsolete tonnage now in existence in these services show that a progressive and modernizing renewal program cannot much longer be evaded.

The turbine gear field has benefitted during the year by the general improvement in turbine design and economy, and this in turn will have a great bearing on the cargo boat of the future, or other types of

ships to which this form of speed reduction is applicable.

Auxiliary electrification has become further entrenched as a standard measure on practically all types of ships during the year, irrespective of the type of main propelling equipment installed. One of the most favorable tendencies is shown by the type of equipment demanded. Open motors and those protected by flimsy or makeshift methods are almost entirely disappearing from the marine field. Their place is being taken by motors built especially for marine service which are adapted to long years of hard usage with negligible cost of upkeep. Automatic and magnetic types of control equipment are also almost completely taking the place of the old types of hand operated rheostatic starters, thereby affording greater protection to and prolonging the life of the equipment.

The operating and service records of the turbine electric drive ships which have been commissioned during the past few years have been of an enviable nature and marked by an almost complete absence of upkeep charges. The CITY OF FLINT carferry, operating on the Great Lakes, which is forced to break ice during the winter months, reports 364 days of continuous duty during the year with one day lay up only for annual government inspection. The mileage covered exceeded 101,000 which may be very close to a world's record. The yacht CORSAIR also reports having covered 25,000 miles during one year.

The clocklike regularity and maintenance of schedules by the large fleet of turbine electric propelled passenger ships, and the maintenance of the same high efficiency as when new has been gratifying to the owners and operators and also confirms the early opinions of the design engineers with respect to the complete reliability of this form of drive. The passengers also continue to be particularly satisfied with the electric drive ships, and this in turn has tended to greatly popularize the various trade routes to which the ships have been assigned.

The S. S. PRESIDENT HOOVER equipment for which was furnished by the General Electric Company, and the S. S. PRESIDENT COOLIDGE equipment for which was furnished by the Westinghouse Electric & Mfg. Co. were commissioned during the year.

The S. S. PRESIDENT HOOVER under-

went her trial trip off the coast of Maine in June and sailed on her maiden voyage from New York to California and transpacific ports on Aug. 6. The trials were especially noteworthy, not only because they were the most complete ever undertaken with a merchant ship, but because all guaranteed and expected operating values were exceeded by a comfortable margin. On the maximum power run, a speed of 22.2 knots was attained with a developed horsepower of 32,872. At the normal rated power of 26,500 shaft horsepower the speed attained was 20.83 knots. The fuel consumption per shaft horsepower hour for all purposes was 0.669 pound of oil at normal rated power.

Reports of the maiden voyage show that all passenger accommodations were taken, and laudatory remarks were also received in regard to the perfect riding qualities of the ship, its freedom from rapid pitching and rolling, and complete absence of vibration. The ship encountered one storm in Asiatic seas, and the navigational personnel were particularly pleased with the performance of the electric drive equipment under the severe conditions. A complete article on this ship appeared in MARINE REVIEW for August,

The TALAMANCA and SEGOVIA, first two of a fleet of six new turbine electric propelled, combination passenger and freight ships for the United Mail Steamship Co., were rapidly nearing completion at the fitting out docks of the Newport News Shipbuilding & Dry Dock Co. at the end of the year. The CHIRIQUI was also on the building ways at the same yard. The three ships, the ANTIGUA, QUIRIGUA, and VERAGUA, which are being built at the Bethlehem Shipbuilding Co.'s plant at Fore River, Quincy, Mass. A complete article on the TALAMANCA appears elsewhere in this issue.

The year 1931 was marked by a substantial advancement of turbine electric drive in Europe. Propelling equipments were completed for three ships by the British Thomson Houston Co., of England, and construction started for one ship by the Societe Generale de Constructions Electriques Et Mechaniques (Alsthom) of France.

Of those built in England the STRATHNAVER and STRATHAIRD are of especial interest because they are the highest powered turbine electric drive merchant ships so far built in England. These vessels are additions to the fleet of the Peninsular and Oriental Steam Navigation Co., the first European company to adopt turbine electric drive for a large passenger vessel, and owner of the VICEROY OF INDIA. The STRATHNAVER and STRATHAIRD are much larger than the VICEROY OF INDIA, and are twin-screw ships of 28,000 rated shaft horsepower having a service speed of 22 knots. The STRATHNAVER was commissioned in August, and the STRATHAIRD

(Continued on Page 46)

The author, D. W. Niven, is manager, Federal & Marine Department, General Electric Co. This article is a full abstract of a review by him of progress and trend of power applications in the marine field during 1931.

# Exhaust-Turbine Installations With Spring Gearing

**A**MONG the papers presented before the American Society of Mechanical Engineers on Nov. 30, last, was one on *Design of Spring Gears for Exhaust-Turbine Installations*, by J. Ormondroyd and T. C. Kuchler, both connected with the South Philadelphia works of the Westinghouse Electric & Mfg. Co.

This paper outlines the necessity for flexibility in the coupling linkage of a turbine with a reciprocating engine driving the same shaft. A resume of the history of the problem is given. The conditions which must be fulfilled for satisfactory operation and the details of the calculation to fulfill these conditions are discussed. For simplicity the design chosen relies on propeller damping to hold the torque oscillations within safe limits. Tests with and without flexibility in the turbine gearing are described. It is shown that the problem depends on the vibration characteristics of the system and that a solution can be made if the drawing of the rotating part and a few engine indicator cards at different speeds are available.

In view of his close connection with installations of the exhaust-turbine type for ships, we give below the discussion on this paper submitted by Hans Bauer. Mr. Bauer said:

For purposes of discussion this paper may be considered under two headings: First, the application of exhaust turbines in reciprocating engined ships, and second, the mathematical theory of oscillations in elastic rotating systems.

Concerning the first application, I am able to offer observations based upon the successful operation of over 200 vessels equipped with exhaust turbines constructed according to the Bauer-Wach system and aggregating approximately one million horsepower. In that system, two single reduction gears are connected by a Vulcan hydraulic coupling, the latter being interposed between the high speed gear shaft and the low speed pinion shaft. The hydraulic coupling serves both to absorb shocks and vibration and as a clutch to disconnect the turbine and high speed gear from the engine and low speed gear when maneuvering; or at other times when it is desired to run on the engine alone.

## Disconnecting the Exhaust Turbine

Reversing is best performed when the exhaust turbine is disconnected, since it is practically impossible to synchronize the admission of steam to turbine and reciprocator as required

for maneuvering, quite apart from the complicated design that it necessitates. Therefore, if the turbine is kept continually coupled to the engine, the gear teeth and the whole system are repeatedly subjected to reversal of stresses of unknown magnitudes. It may be claimed that this can be overcome by using the turbine alone when maneuvering. To do so, however, restricts the maneuvering power to that available from the turbine and there are still torque variations due to dragging the engine. The much simpler method is to disconnect the turbine and use the engine for maneuvering.

That the hydraulic coupling provides complete protection of the turbine and gear system against torsional shocks or vibrations originating in the engine and propeller system may be seen from torsionographs which have been published from time to time. This result is considered ample justification for a slippage which, be it noted, constitutes about one-half of one per cent of the total power.

To introduce springs into an oscillating system is to invite trouble from vibration. By proper proportioning of one to the other, the period may be controlled, but the tendency to oscillate remains and will be felt at some frequency. The authors admit it is impossible to design a spring coupling to damp out torsional vibrations at all speeds, and they should not be satisfied if they have succeeded in doing this in or near the usual running range of the engine, since, as all marine engineers know, a marine engine may be called upon to run at any speed up to the maximum, according to weather conditions, load, etc., and if torsional vibration occurs even for only a short period, it may be detrimental to the gearing. Conditions in an oscillating system like the above, linked by a flexible and elastic member, will be much more difficult to determine and almost impossible to control, if the propeller is momentarily lifted out of the water in a sea-way.

## Uncertainties of Propeller Damping

It is not quite clear what the authors mean by "propeller damping." The degree of propeller damping must necessarily be different under different draft and weather conditions. The propeller cannot prevent resonance as between the turbine system and the engine system. Springs interposed between the two systems obviate the extreme stresses due to short period oscillations but are not effective; in fact, constitute a source of danger

when the frequency of the impressed forces approaches the natural frequency of oscillation of the spring coupled system.

A hydraulic coupling, on the other hand, not being elastic, does not transmit any torsional oscillations.

The authors are to be commended for having gathered and analyzed mathematical researches relating to torsional vibration and the design of spring couplings. To criticise a detail, however, it does not seem to me advisable to base designs on stresses as high as 32,000 pounds per square inch in spring steel, since the springs may at times be compressed to the maximum travel when, as stated by the authors, the stress would be raised to 52,500 pounds per square inch. This may occur frequently, as for example, with a racing impeller in rough weather, or, again, in maneuvering. It may be interesting to know the physical properties of the steel used.

## United States Lines Co. Begins Operations

Final approval was given by the United States shipping board on Dec. 4 to the consolidation of the Dollar, Dawson, I. M. M. Roosevelt and the United States Lines, the largest shipping combine on this side of the Atlantic. Under this arrangement the fleets, mail contracts and other properties of the constituent companies passed to the United States Lines Co.

The Nevada company is the holding company, the Roosevelt Steamship Co. the operator and the Roosevelt International Mercantile Marine Co. the parent company of these lines as well as the Atlantic Transport, Leyland, Panama Pacific, Red Star, American and Baltimore Mail lines.

The new owners are listed as follows: P. A. S. Franklin, chairman of the board; Kermit Roosevelt, president, and John M. Franklin and Basil Harris, vice presidents of the Roosevelt Steamship Co.; R. Stanley Dollar, president of the Dollar Steamship Co.; Kenneth D. Dawson, president of the States Steamship Co. of Portland, Oreg.; William Humphreys, chairman of the board of the Associated Oil Co. and said to be the representative of the Fleishhacker banking interests of San Francisco; George Hinkins, general manager Dollar line in New York.

The Roosevelt Steamship Co. announced that effective Dec. 8 all business pertaining to the United States lines and the American Merchant lines would be handled in the office of the company at 1 Broadway, New York, and through its offices and authorized agents throughout the United States, Canada and Europe. The offices of the former United States lines at 45 Broadway were transferred to 1 Broadway on Dec. 12.

# Latest Data on New Marine Work

Information on New Ships Ordered—Building and Repair Contracts Let—Shipping Board Loans Made, Authorized or Pending

**A**CCORDING to the monthly report of the department of commerce, American shipyards on Nov. 1 were building or were under contract to build for private operators 92 vessels aggregating 287,554 gross tons, compared with 89 vessels aggregating 293,747 gross tons on Oct. 1, 1931.

A summary of reports of shipyards shows that 22 steel self propelled vessels each of 1000 gross tons and over were under construction. The Bethlehem Shipbuilding Corp. had under construction seven vessels, three passenger and cargo vessel of 17,500 gross tons for the Oceanic Steamship Co.; three passenger and cargo vessels of 7200 gross tons each for the United Mail Steamship Co.; and one tanker of 1534 gross tons for the Standard Transportation Co. The Federal Shipbuilding & Dry Dock Co. was building four passenger and cargo vessels of 11,000 gross tons for the Grace Steamship Co. At the Newport News Shipbuilding & Dry Dock Co. a total of seven vessels were under construction, three passenger and cargo vessels of 7500 gross tons for the United Mail Steamship Co.; two passenger and cargo vessels of 5400 gross tons each for the Colombian Mail Steamship Co.; and two passenger and cargo vessels of 5700 gross tons each for the Eastern Steamship lines. The New York Shipbuilding Co. was building two passenger and cargo vessels of 30,000 gross tons each for the United States line. Four tankers of 9000 gross tons each were building at the Sun Shipbuilding & Dry Dock Co. for the Motor Tankship Co.

## Submarine Equipment

The Westinghouse Electric & Mfg. Co. have just been awarded a contract by the United States navy department for the complete electrical equipment for United States submarine CACHALOT, now building at the Portsmouth, N. H., navy yard.

The contract price was approximately \$90,000 and the equipment to be furnished consists of two 800 horsepower, double armature, 335 revolutions per minute submarine type propulsion motors, two sets of cooling and ventilating equipment consisting of air coolers, blowers and pumps, and one manual submarine type control. Delivery of this equipment will be made the latter part of 1932.

## Urge Naval Construction

Ranking members of both the house and senate naval affairs committees Dec. 1 moved forward with their plans for a naval construction program to bring the navy up to the requirements of the London naval treaty.

The legislation contemplated is designed to authorize everything provided for under the London treaty, and provides for the construction of flying deck cruisers, and an additional airplane carrier, from 10 to 15 destroyers, and four or five submarines. Under the legislation, Mr. Britten estimated an expenditure of \$760,000,000 would be authorized next year.

## Change to Self Unloaders

American Shipbuilding Co. of Cleveland has just closed a contract with the American Steamship Co. for reconstructing three 10,000-ton lake vessels. The ships are to be changed into self-unloading vessels for the transportation of limestone from Alpena, Mich., to Fairport, O. The work will be done at the Lorain plant of the company and will give employment to about 1000 men for four months. About 3000 tons of steel will be used.

## To Replace Furness Liner

Within 24 hours of the destruction of the Furness-Bermuda liner BERMUDA by fire at her pier in Belfast, a contract for a liner to replace her had been let, it was learned recently. The contract is for a sister ship to the new MONARCH OF BERMUDA, which is to arrive Monday to start her maiden trip to Bermuda. The contract was awarded to Vickers & Armstrong.

The workmen and experts used in constructing the MONARCH OF BERMUDA will be employed on the new liner, and they will go to work immediately. The same plans and forms will be used. The new vessel is to cost about \$8,000,000.

## Bids for Patrol Boat

Department of the interior, Seattle, will receive bids shortly for the construction of a rangers' patrol boat for the United States forestry service. Specifications call for a wood hull 55 feet long, 14 feet beam and 7 feet depth. Power will be furnished by

an 80-horsepower diesel engine. Date for receiving bids is not yet made known. Upon completion, the patrol boat will be shipped on steamer deck to Ketchikan, Alaska.

The office of supervisor of New York harbor has invited bids for furnishing all labor and materials and performing all work for one 121-foot steel hull, diesel driven patrol boat.

## Awarded Turbine Contract

Contract for geared turbine machinery to be installed on the battleship NEW MEXICO, now at Philadelphia navy yard, has been awarded to the Westinghouse company, and the new engines will be built at the South Philadelphia plant of the company. The contract also calls for similar installations on the battleships IDAHO and MISSISSIPPI, now at Norfolk navy yard.

## Ask Bids for Dredges

The office of the chief of engineers, United States army, war department, Washington, has advertised for two steam-driven, stern-wheel river dredges.

Length, molded, feet, inches....	200	0
Length, overall, feet, inches....	265	2
Breadth hull, molded, feet, inches .....	47	10
Breadth hull, over all, feet, inches .....	48	7½
Depth, molded, feet, inches.....	8	0
Draft, feet, inches .....	4	8
Type .....	Stern-wheel	
Propulsion .....	Steam	
Main generating set.....	Turbine-driven	
Dredging pump.....	20-inch electric driven	
Auxiliaries .....	Steam and electric	
Boilers .....	Water tube	
Hull .....	All steel	
Main deck house .....	All steel	
Upper deck and houses.....	Wood	
Type of dredging ladder.....	Cutter	

The Canulette Shipbuilding Co. of Slidell, La. has ordered necessary steel for the construction of the major portion of the steel boats and barges that it contracted to build for the Louisiana-Texas Waterways Corp. of New Orleans. They are at present building a steel ferry of thirty automobiles' capacity for the Tampa Bay Ferry Co. of Tampa, Fla. This boat will be powered with two 200 horsepower Atlas Imperial diesel engines. The company states that the general trend of business is improving very rapidly.

## Plans for Three New Ships

Reports received from Seattle state that Carl Robinson, Northwest manager for Swayne & Hoyt Inc., owners of the Gulf Pacific Mail line Ltd., has received preliminary plans for three passenger and freight ships to be built for the new mail route established recently by the government from Seattle to Puerto, Colombia; Colombia to Kingston, Jamaica, and Tampico, Mexico.

The plans provide that the new ships will be 400 feet long, 59 feet beam and 24 feet in depth, with a displacement of 11,494 tons and a deadweight tonnage of 7500. The vessels will have a total capacity of 403,000 feet, including 33,000 cubic feet of refrigerator space.

The ships will have a speed of 13 knots. They will go from Seattle to Puerto Colombia, Kingston and Tampico and then to New Orleans, Mobile and other United States gulf ports. A monthly passenger, mail and freight service will be maintained by the Gulf Pacific Mail Line Ltd., Colonel Robinson has announced.

Cargo handling equipment will be of the very latest type. Each ship will also have total accommodations for 20 cabin passengers.

## Plan New Carferry

The Florida East Coast Car Ferry Co., which operates the ferry service between Havana and Key West proposes to continue its Key West service with one new carferry and shift the other two carferries to the proposed New Orleans-Havana service, making stopovers at Key West when necessary.

## Launch New Liner

The ANTIGUA, first of three turbo-electric liners building at the Fore River yard of the Bethlehem Shipbuilding Co. for the United Fruit Co. at a total cost of \$10,500,000, was launched Dec. 12.

Mrs. Victor M. Cutter, wife of the president of the United Fruit Co., was sponsor. The ANTIGUA, named after the ancient capital of Guatemala,

will ply between the United States and Latin America. She is 447 feet long, with 60-foot beam, 34-foot draft, and 11,000 tons' displacement. She will accommodate 120 passengers.

In addition to the three vessels being built here, three others are being constructed at Newport News, Va. The shipyard turning out the best ship will be awarded the contract for a seventh liner of similar design, according to reports.

## Dredge Equipment Award

The Westinghouse Electric and Mfg. Co. announce receipt of a contract from the Dravo Contracting Co. of Pittsburgh, Pa., for the main dredging equipment for a stern wheel dredge for the war department, United States engineers corps, which will be used in the St. Louis district.

## Shows High Speed in Trials

The \$8,000,000 Matson liner MARIPOSA, launched July 18 at Quincy, returned to her builder's yard at noon Dec. 11 with a speed record which will make her one of the fastest American liners in the Pacific service. On her fastest run over the mile course of Rockland, Me., she logged 22.843 knots, or 29.69 miles an hour.

Trials included 14 runs over the measured mile course at various speeds and a 12-hours endurance run at maximum speed. She will be taken over by the Matson line early in January and will sail from New York on her first cruise to the Far East and South Seas Jan. 22, reaching her home port at San Francisco in time to go into the San Francisco-Australia service with her sistership, the MONTEREY, which was launched recently, also at Quincy.

The MARIPOSA is the first of three sisterships being built by the Matson line for the Pacific service. The third will be named the LURLINE. Each of the vessels is of 26,000 tons displacement and is 632 feet long, 75 feet wide and 28 feet in draft. Twin screws drive the ships, which have nine decks and accommodations for 750 passengers, divided in first and cabin classes.

## Approve Loan Application

The shipping board Nov. 27 approved the application of Seatrain Lines, Inc., a corporation of the state of Delaware, for loans from the construction loan fund to be used in aid of the construction of two new vessels to be used in ocean mail contract service on Route No. 56 from New Orleans, La., to Havana, Cuba, and other foreign service. The total cost of each vessel will be \$1,586,250, including commercial appliances. Each vessel will be approximately 473 feet long, 63½ feet beam and 22 feet draft with approximately 8445 deadweight tonnage. They will be equipped with geared turbine propelling machinery having a normal shaft horsepower of 6500 and will have speed of approximately 15 knots.

The board's approval authorizes a separate loan on each vessel, each loan to be for an amount not to exceed three-fourths of the cost of construction, not exceeding \$1,152,187 each, plus not to exceed three-fourths of the cost of the necessary equipment for each vessel, not exceeding \$37,500 each, the latter to include spares, commercial appliances, etc.

The vessels will be constructed in the yards of the Sun Shipbuilding and Dry Dock Co., Chester, Pa.

The Seatrain Lines, Inc. will take over all the assets of the Over-Seas Railways, Inc.

## Small Suction Dredge

A new suction dredge, small enough to be trucked knocked down to any inland water supply and strong enough to stand the strain of launching under trying conditions, has just been built for the department of public works, division of water, of the city of Newark, by United Dry Docks Inc. on its patented truss-weld system. The dredge, which is now at work cleaning the bottom of the Macopin reservoir, is only 31 feet long and 14 feet beam, with two feet draft, carries a full sized 6-inch suction of standard design and cutter machinery. The hull is made in two pontoon sections to be bolted together in the water. It will dig to a depth of 10 feet below water.

## Bunker Prices

### At New York

	Coal alongside per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
Dec. 18, 1931	4.50@5.00	.65	3.25
Nov. 18	4.50@5.00	.65	3.25
Oct. 18	4.75@5.00	.65	3.25
Sept. 18	4.75@5.00	.75	3.47½
Aug. 18	4.75@5.00	.75	3.47½
July 18	4.75@5.00	.85	3.72½
June 18	4.85@5.25	.90	3.84½
May 18	4.85@5.25	1.00	4.08
April 18	4.85@5.25	1.10	4.32
Mar. 18	4.85@5.25	1.10	4.55½
Feb. 18	4.85@5.25	1.10	4.55½

### At Philadelphia

	Coal trim in bunk per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
Dec. 18, 1931	4.50@5.00	.75	3.45
Nov. 18	4.50@5.00	.75	3.45
Oct. 18	4.75@5.00	.75	3.45
Sept. 18	4.75@5.00	.75	3.45
Aug. 18	4.75@5.00	.75	3.45
July 18	4.75@5.00	.85	3.70
June 18	4.85@5.25	.90	3.80
May 18	4.85@5.25	1.00	4.4
Apr 18	4.85@5.25	1.00	4.60
Mar. 18	4.85@5.25	1.00	4.88
Feb. 18	4.85@5.25	1.00	4.88

### Other Ports

Boston, coal, per ton	\$7.33
Boston, oil, f. a. s., per barrel	0.91
Hampton Roads, coal, per ton, f.o.b., piers	\$4.25 to \$4.35
June 9—Cardiff, coal, per ton	13s 6d
London, coal, per ton	—s —d
Antwerp, coal, per ton	18s 9d
Antwerp, Fuel oil, per ton	67s 6d
Antwerp, Diesel oil, per ton	82s 6d
British ports, Fuel oil	67s 6d
British ports, Diesel oil	82s 6d

# Converted Destroyers Enter Fruit Carrying Trade

**D**EVELOPING an average speed of slightly better than 15.5 knots, the converted destroyer TEAPA, formerly the U. S. S. WORDEN, now operated by the Standard Fruit & Steamship Co., Dec. 8 completed a trip from New Orleans to La Ceiba, Honduras, to New York, on 171 barrels of distillate diesel fuel oil. She carried 20,000 bunches of bananas and one day made 16.1 knots for a long time.

The TEAPA, powered by two Ingersoll-Rand 750 horsepower diesel engines made the run from La Ceiba to New York in 103 hours and 26 minutes, being delayed 20 minutes by a broken fuel line. The run from New Orleans to New York, via La Ceiba, is approximately 2750 miles.

In addition to the TEAPA, the Standard Fruit line operates the TABASCO, the converted diesel engined destroyer PUTNAM.

One reason which made these boats a feasible undertaking was their shallow draft, making it possible to enter rivers in the tropics and thus reducing handling and loading charges. Speed is also an important factor in the transportation of bananas in non-refrigerated ships and advantage was taken of the fine lines of these vessels, thus securing a maximum of speed for the power installed.

The vessels were converted to hulks and the hulls towed to New Orleans, where they were reconditioned by the Todd Engineering Dry Dock & Repair Co. of New Orleans, La.

In the reconditioned stage each shaft is now driven by an Ingersoll-Rand six cylinder, 16-inch bore by 24-inch stroke single-acting solid injection diesel engine, developing 750 brake horsepower at 270 revolutions per minute. Each vessel is equipped with the following auxiliaries:

Two Ingersoll-Rand 5-inch by 2½

by 4-inch stage compressors; one of these units being motor driven and the other by Novo gasoline engine.

The 35 kilowatt Westinghouse generator, driven by an Ingersoll-Rand 2-cylinder 8 1/4-inch by 12-inch diesel

One 15 kilowatt General Electric generator, driven by a Novo 4-cylinder gasoline engine.

Two Dean Bros. 6-inch by 6-inch motor driven horizontal duplex double acting piston type power pumps. One of these pumps is equipped with enough power to be used for a fire pump, and the other used as bilge and general service pump.

One Cameron centrifugal pump, capable of delivering 300 gallons per minute, which is used as auxiliary water circulator for the two main engines.

One Viking twin oil pump outfit, consisting of two rotary pumps of 90-gallon capacity each, driven by a single motor. One of these pumps is used for fuel oil transfer and the other for emergency lubricating oil circulating pump for the main engines.

There are also two Roper rotary pumps; one being used as sanitary

pump and the other for fresh water.

The steam steering engine was converted by the Benson Electric Co. to electric by removing the steam cylinders and the end stand and installing a new end stand with a large gear driven by two 7½-horsepower motors.

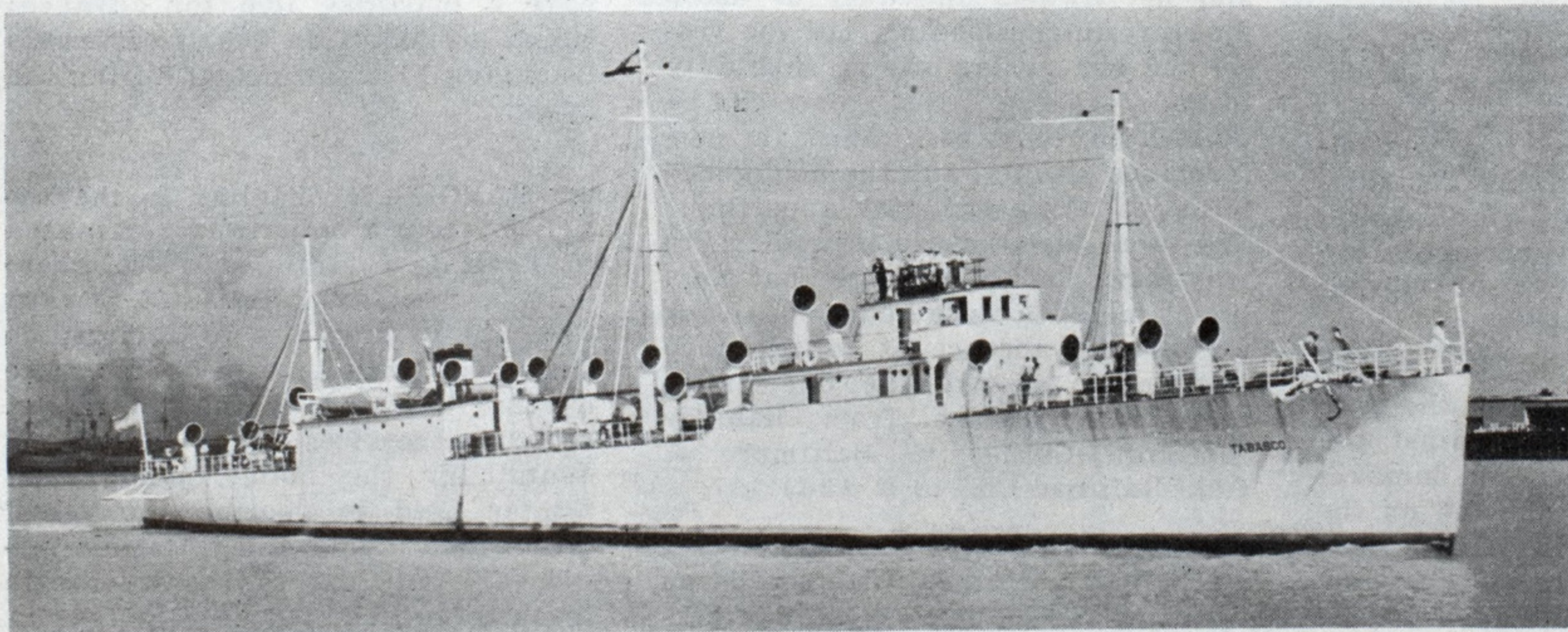
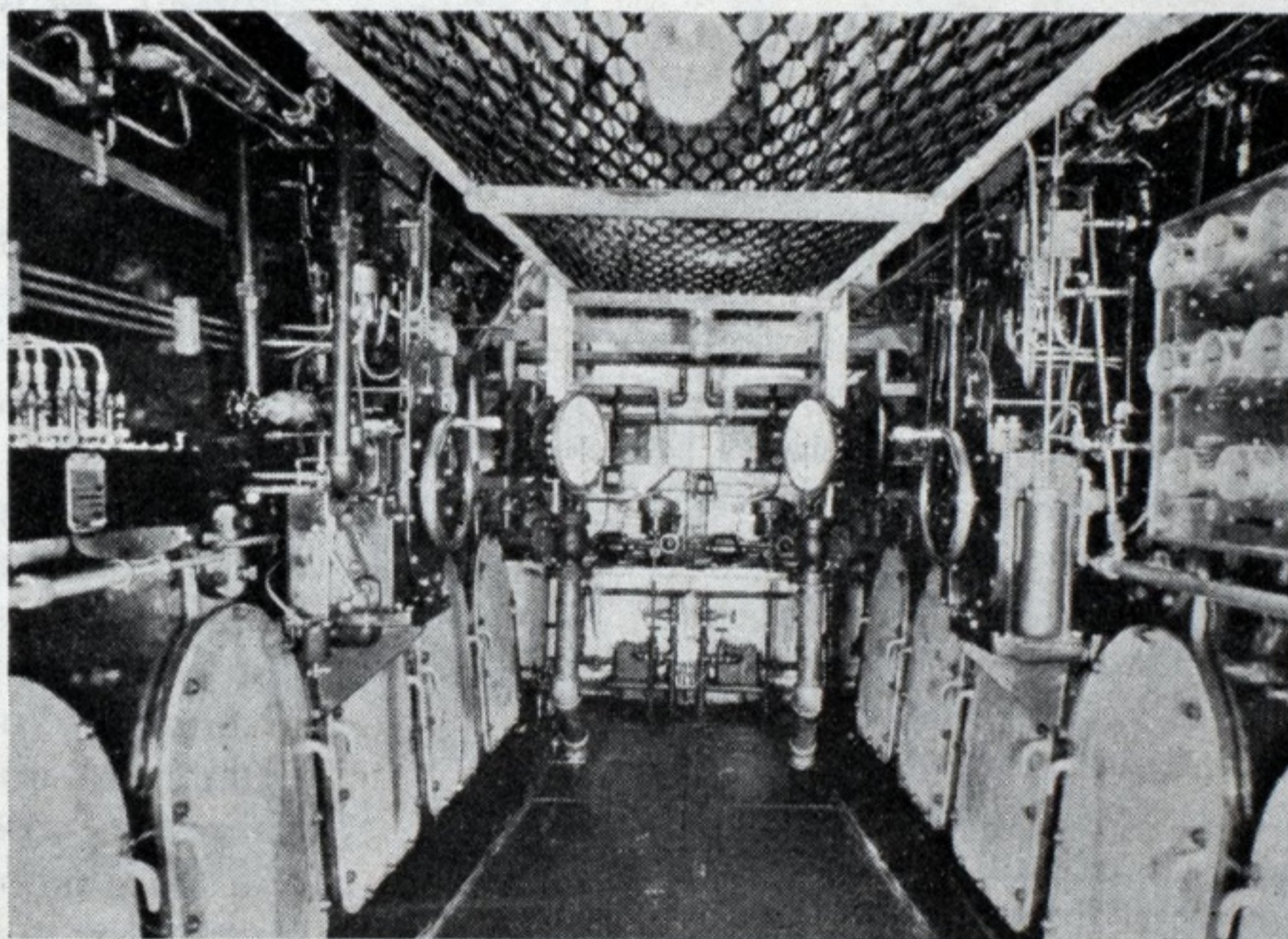
Cargo handling equipment consists of four Novo gasoline driven single drum reversible winches with two nigger heads, and capable of handling 4000 pounds 120 feet per minute.

When the vessels were reduced to hulks all of the deck houses were removed and in their place a forward and after house were erected. The forward house includes two passenger rooms, and a bath, on the starboard side; and the two mates' rooms, wireless operator room, and a bath, on the port side; also dining salon, galley, ice box and store room.

The vessel has been divided into four cargo holds, and has a total carrying capacity of 20,000 bunches of bananas. The vessel, in the converted condition, has four hatches serving the four holds. Below are the particulars of the vessel:

Length between perpendiculars, feet, inches.....	310	0
Length overall, feet, inches.....	314	10½
Beam molded, feet, inches..	30	11½
Depth molded, feet, inches..	20	7¾
Freeboard, feet, inches.....	10	4½
Gross tonnage .....	1184	
Net tonnage .....	704	
Cargo carrying capacity, stems bananas .....	20,000	
Speed, knots .....	15½	

*Right—View along center aisle in engine room of the Teapa, sistership of the Tabasco shown below. Powered with two 16-inch bore by 24-inch stroke single acting solid injection Ingersoll-Rand diesel engines developing 750 horsepower at 270 revolutions per minute. On her first voyage, the Teapa averaged over 15.5 knots*



*Left—The Standard Fruit & Steamship Co. converted vessel Tabasco, formerly the destroyer Putnam. The Tabasco is a sistership of the Teapa which completed a trip recently from New Orleans to New York by way of La Ceiba, Honduras, a distance of about 2750 miles on 171 barrels of distillate diesel oil, and carrying 20,000 bunches of bananas*

# Late Decisions in Maritime Law

## Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review

By Harry Bowne Skillman

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ORDINARILY, a boat chartered for a specified use is impliedly warranted, the charter being silent as to that, to be suitable for the known purpose for which it is to be used. It must be that to be seaworthy for the service intended. But, where the charterer takes a dirty boat and agrees to clean it, the implied warranty of seaworthiness is only to the effect that it will be suitable for the contemplated use when properly cleaned, and in the case of *LAWRENCE J. TOMLINSON*, 48 F. (2d) 88, the court held that a charterer agreeing to clean a tank barge last used in carrying molasses could not recover damage because of discoloration of gasoline in dirty tanks.

\* \* \*

WHERE damage to a cargo was due to causes within exceptions to the bills of lading, the vessel is not liable unless it is proved that such causes were due to the vessel's negligence.—*HOG ISLAND*, 48 F. (2d) 101.

\* \* \*

THE measure of damages for death on the high seas, under act of congress of March 30, 1920, is the amount of pecuniary benefits which might reasonably be expected to accrue to the beneficiary had the deceased lived. "The manifest purpose of congress," it was declared in the case of *CITY OF ROME*, 48 F. (2d) 333, "was to compensate beneficiaries as fully as money can for the loss sustained. Adequate allowance must, of course, be made for the earning power of money; and ascertained amount based upon the deprivation of future benefits must be discounted to make it equivalent to their present value. Thus circumscribed, the assessment of damages resulting from loss of life comprises many elements. The deceased's age, his earning capacity, his surviving beneficiaries, their ages, and his contributions to them, his condition of health, his prospects of advancement, are among the elements to be considered."

\* \* \*

UNDER the maritime law the master has no action against the owners of the vessel for damages for willful assault committed on the high seas by members of the crew. A felonious assault cannot be held to have taken place in the course of

his employment or in the furtherance of the master's business when it is committed by the crew upon the master, whom the crew must obey, and an allegation that members of the crew had felonious and criminal propensities does not sustain a cause of action in negligence in the absence of an allegation that defendant owner of the vessel knew of these propensities or had knowledge of facts putting it on notice.—*Birks v. United Fruit Co.*, 48 F. (2d) 655, 656.

\* \* \*

THE maritime lien is adopted from the civil law, and imports a tacit hypothecation of the subject of it. It is therefore stricti juris and cannot be extended by construction, analogy, or inference. It was held, therefore, in the case of *TENBERGEN*, 49 F. (2d) 363, that a cargo owner voluntarily repaying consignees the amount paid them as harbor dues and port charges was not entitled to a maritime lien against the ship.

\* \* \*

THE duty rests upon the master to see that cargo is properly stowed so that the vessel will be seaworthy. The instrumentalities used for loading and the methods of work, however, are matters within the control of the contracting stevedore. In the absence of some showing that the master directed the use of negligent methods, expressly approved them, or consented to their use, there is no principle upon which the stevedore can be absolved from liability to the vessel for negligence in using them. The stevedore owes to the vessel and her owners the duty of using due care in the loading, but the vessel and her owners owe no such duty to the stevedore. Negligence can be predicated only of failure in performance of duty, and the negligence is his to whom the duty appertains. The mere fact that an injured party may have had knowledge that negligent methods were being used does not, in the absence of contributory negligence, absolve the one guilty of such negligence from liability therefor.—*Cornec v. Baltimore & Ohio Railroad Co.*, 48 F. (2d) 497.

\* \* \*

THOUGH performed without charge a tow service once it is undertak-

en must be performed with due care.

\* \* \*

THE liability of a tug towing a barge, it was held in the case of *PERTHE AMBOY*, 48 F. (2d) 640, is not that of an insurer, but it is only held to the exercise of reasonable skill and care such as a prudent navigator would exercise under similar circumstances. When damage is caused by stranding of the barge upon well-known shoals, on the wrong side of a charted channel, a prima facie case of negligence is made out, and the burden then passes to the tug to explain the cause of the disaster in such a way as to exonerate it from liability. A duty rests on the tug to keep the barge within the limits of the channel, and the master will be held equally at fault whether deviation from the usual and customary course was due to inattention or to excessive speed aided by the force of the current. When the captain of the tug finds that smoke coming from plants on shore is interfering with visibility, reasonable care and prudence would dictate the necessity of placing on the bow of the barge an attentive lookout.

\* \* \*

IN THE case of *M. VIVIAN PIERCE*, 48 F. (2d) 644, it was said: "There can be no question concerning the right of seamen to assert a lien upon the vessel for their wages. \* \* And it has long been the established rule in admiralty that one advancing money to discharge a valid lien gets a lien of equal dignity with the one discharged. \* \* The established rule is that a general agent does not have a maritime lien for advances which he makes on behalf of vessels belonging to his principal during the agency."

\* \* \*

CHARGES for hauling to the water front a boiler and pump used in floating a stranded vessel were held in the case of *HALL*, 48 F. (2d) 646, not to give rise to a maritime lien. The same is true of insurance expense incurred by the contractor. However, services of a diver and rental for the boiler, pump, and lighter used in floating the vessel constituted "labor and materials furnished," entitling the contractor to a maritime lien.

# Marine Business Statistics Condensed

## Record of Traffic at Principal American Ports for Past Year

### New York

(Exclusive of Domestic)				
Month	Entrances		Clearances	
	No. ships	Net tonnage	No. ships	Net tonnage
November, 1931....	304	1,564,284	308	1,542,849
October .....	309	1,626,094	322	1,708,560
September .....	523	2,724,761	522	2,641,711
August .....	541	2,785,703	531	2,739,919
July .....	538	2,626,814	563	2,754,107
June .....	541	2,747,134	526	2,596,749
May .....	478	2,434,601	511	2,542,351
April .....	496	2,538,201	527	2,656,992
March .....	494	2,396,654	489	2,323,422
February, 1931....	439	2,127,771	484	2,261,468

### Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district) (Exclusive of Domestic)				
Month	Entrances		Clearances	
	No. ships	Net tonnage	No. ships	Net tonnage
November, 1931....	52	148,335	37	111,969
October .....	69	192,159	57	160,609
September .....	66	172,313	54	155,113
August .....	81	208,854	59	147,948
July .....	76	201,677	59	155,114
June .....	75	218,611	50	127,906
May .....	82	235,108	62	170,497
April .....	68	139,113	51	136,433
March .....	65	198,848	46	116,786
February, 1931....	69	200,212	53	163,134

### Boston

(Exclusive of Domestic)				
Month	Entrances		Clearances	
	No. ships	Net tonnage	No. ships	Net tonnage
November, 1931....	75	241,142	52	166,786
October .....	98	325,261	66	241,072
September .....	109	339,482	78	263,783
August .....	131	388,799	98	305,488
July .....	131	362,111	94	290,733
June .....	130	347,787	97	264,467
May .....	108	311,171	91	293,146
April .....	107	292,403	89	233,756
March .....	97	279,797	66	243,377
February, 1931....	76	259,402	57	190,598

### Portland, Me.

(Exclusive of Domestic)				
Month	Entrances		Clearances	
	No. ships	Net tonnage	No. ships	Net tonnage
November, 1931....	17	40,991	19	47,514
October .....	17	39,060	16	34,195
September .....	27	48,534	26	52,035
August .....	29	50,249	23	39,273
July .....	24	52,979	22	52,945
June .....	17	23,216	17	26,397
May .....	12	20,821	11	22,573
April .....	11	30,000	10	25,765
March .....	6	20,081	7	20,122
February, 1931....	18	48,722	15	45,664

### Providence

(Exclusive of Domestic)				
Month	Entrances		Clearances	
	No. ships	Net tonnage	No. ships	Net tonnage
October .....	6	23,833	6	23,836
November, 1931....	9	35,826	5	18,040
September .....	6	20,330	3	11,160
August .....	10	41,671	3	12,240
July .....	6	25,062	7	30,748
June .....	6	21,104	3	12,211
May .....	9	37,120	2	8,674
April .....	8	32,848	6	25,101
March .....	5	18,288	4	17,400
February, 1931....	9	43,707	8	30,036

### Portland, Oreg.

(Exclusive of Domestic)				
Month	Entrances		Clearances	
	No. ships	Net tonnage	No. ships	Net tonnage
November, 1931....	26	103,835	47	182,585
October .....	36	144,875	54	207,518
September .....	32	126,256	49	199,803
August .....	29	114,582	31	119,968
July .....	28	107,694	48	174,226
June .....	30	116,953	35	139,799
May .....	24	94,695	39	142,847
April .....	26	104,099	36	141,036
March .....	41	158,869	46	173,220
February, 1931....	24	95,726	43	175,697

### Baltimore

(Exclusive of Domestic)				
Month	Entrances		Clearances	
	No. ships	Net tonnage	No. ships	Net tonnage
November, 1931....	99	304,138	98	314,109
October .....	116	388,308	111	385,136
September .....	111	350,556	117	362,970
August .....	122	374,434	118	377,085
July .....	125	393,553	120	379,526
June .....	127	376,049	114	338,066
May .....	110	353,301	118	368,874
April .....	131	409,907	139	420,594
March .....	123	385,514	107	336,157
February, 1931....	99	327,516	106	340,771

### Norfolk and Newport News

(Exclusive of Domestic)				
Month	Entrances		Clearances	
	No. ships	Net tonnage	No. ships	Net tonnage
November, 1931....	23	77,075	47	113,416
October .....	25	76,385	54	146,995
September .....	24	72,333	47	104,255
August .....	21	59,408	54	127,864
July .....	31	77,082	63	149,665
June .....	39	108,710	59	167,488
May .....	22	63,739	49	140,356
April .....	14	31,959	40	116,565
March .....	19	47,982	52	137,616
February, 1931....	15	43,123	46	116,116

### Jacksonville

(Exclusive of Domestic)				
Month	Entrances		Clearances	
	No. ships	Net tonnage	No. ships	Net tonnage
November, 1931....	6	14,295	8	22,180
October .....	10	25,659	9	17,710
September .....	6	12,463	8	18,888
August .....	21	61,439	24	70,922
July .....	9	18,703	5	9,297
June .....	11	24,902	13	24,517
May .....	8	21,046	7	11,045
April .....	15	31,901	5	10,614
March .....	10	17,299	6	7,839
February, 1931....	7	18,934	9	20,915

### Key West

(Exclusive of Domestic)				
Month	Entrances		Clearances	
	No. ships	Net tonnage	No. ships	Net tonnage
November, 1931....	40	53,752	42	53,497
October .....	37	57,588	37	59,408
September .....	36	54,012	35	55,610
August .....	37	56,505	37	56,505
July .....	39	59,268	41	62,526
June .....	63	81,660	63	86,349
May .....	83	91,683	80	90,758
April .....	60	55,493	51	54,656
March .....	60	69,731	56	72,956
February, 1931....	61	70,169	56	69,443

### Mobile

(Exclusive of Domestic)				
Month	Entrances		Clearances	
	No. ships	Net tonnage	No. ships	Net tonnage
November, 1931....	100	214,204	87	189,474
October .....	118	251,661	112	253,721
September .....	104	213,204	102	226,192
August .....	113	217,541	97	194,678
July .....	101	229,960	92	212,634
June .....	88	197,952	93	217,151
May .....	103	194,198	93	194,198
April .....	107	251,402	108	242,685
March .....	109	232,778	102	229,966
February, 1931....	93	222,163	86	206,376

### Seattle

(Exclusive of Domestic)				
Month	Entrances		Clearances	
	No. ships	Net tonnage	No. ships	Net tonnage
November, 1931....	48	209,655	50	215,614
October .....	61	257,329	62	267,366
September .....	52	229,687	50	217,517
August .....	48	202,879	51	213,091
July .....	46	207,651	50	222,816
June .....	52	220,915	52	223,750
May .....	43	185,945	43	184,118
April .....	50	214,534	48	210,117
March .....	47	207,105	49	212,237
February, 1931....	48	212,187	53	233,121

### New Orleans

(Exclusive of Domestic)				
Month	Entrances		Clearances	
	No. ships	Net tonnage	No. ships	Net tonnage
November, 1931....	174	502,867	195	563,095
October .....	179	484,245	172	474,230
September .....	184	539,810	172	509,475
August .....	193	561,399	190	562,090
July .....	185	532,046	192	551,459
June .....	195	576,251	181	536,678
May .....	185	545,474	188	537,148
April .....	159	499,643	172	537,813
March .....	159	499,643	172	537,813
February, 1931....	159	499,643	172	537,813

### Charleston

(Exclusive of Domestic)				
Month	Entrances		Clearances	
	No. ships	Net tonnage	No. ships	Net tonnage
November, 1931....	19	31,125	11	35,588
October .....	20	49,738	22	55,371
September .....	16	29,428	11	19,111
August .....	9	18,293	7	6,274
July .....	13	26,985	10	20,974
June .....	10	23,571	9	21,074
May .....	9	16,418	7	11,884
April .....	17	45,890	19	50,033
March .....	15	36,938	12	27,110
February, 1931....	14	33,837	16	37,092

### Galveston

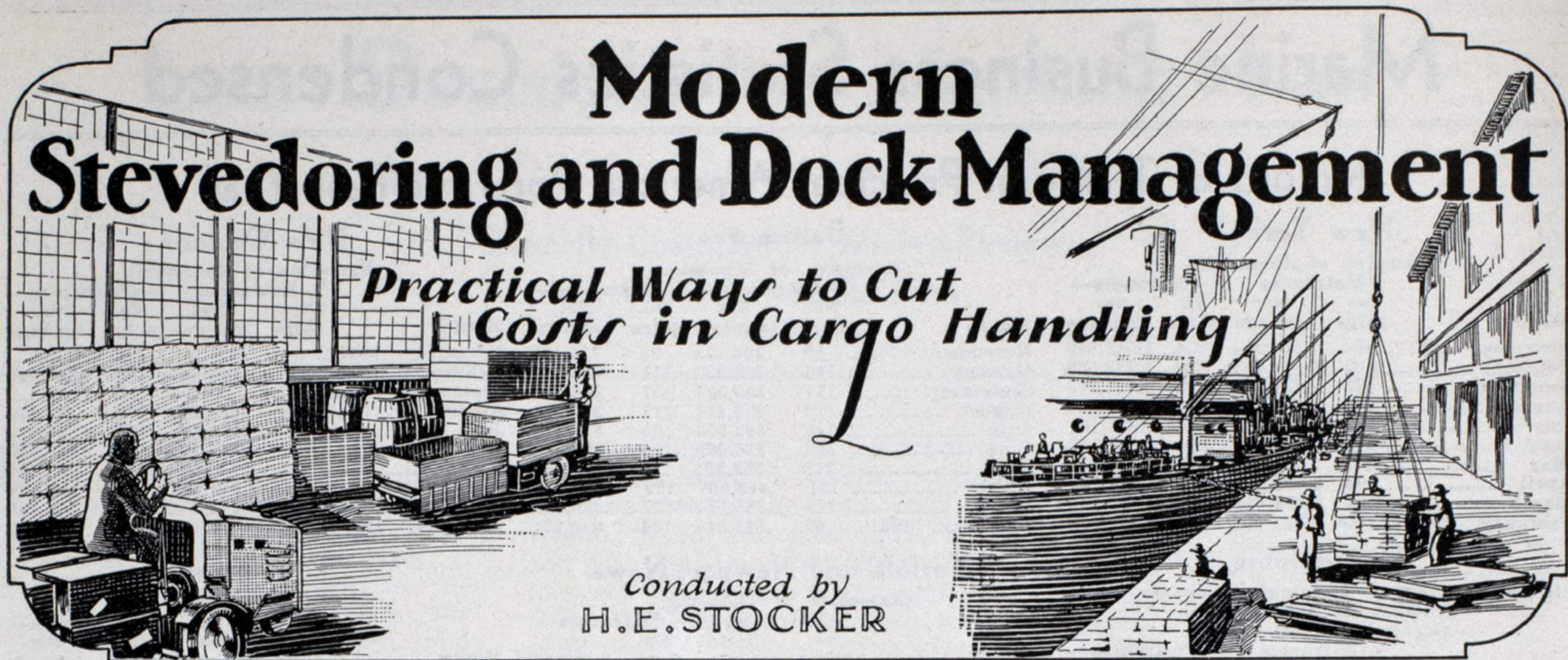
(Exclusive of Domestic)				
Month	Entrances		Clearances	
	No. ships	Net tonnage	No. ships	Net tonnage
November, 1931....	33	81,906	101	328,883
October .....	35	80,748	112	354,607
September .....	27	63,896	99	320,127
August .....	39	85,793	79	234,583
July .....	46	107,008	75	226,381
June .....	35	66,342	73	205,074
May .....	27	53,091	69	191,632
April .....	26	62,924	68	210,315
March .....	25	39,536	69	205,341
February, 1931....	23	40,825	71	209,057

### Los Angeles

(Exclusive of Domestic)				
Month	Entrances		Clearances	
	No. ships	Net tonnage	No. ships	Net tonnage
November, 1931....	147	503,238	142	535,870
October .....	215	720,162	193	678,776
September .....	199	580,683	196	593,882
August .....	199	673,223	204	676,036
July .....	170	622,694	176	636,440
June .....	179	659,029	149	568,208
May .....	210	696,717	194	731,392
April .....	225	644,178	209	626,590
March .....	224	602,763	210	623,023
February, 1931....	181	557,981	196	561,570

### San Francisco

(Exclusive of Domestic)				
Month	Entrances		Clearances	
	No. ships	Net tonnage	No. ships	Net tonnage
November, 1931....	167	688,934	149	614,482
October .....	167	688,934	149	614,482
September .....	158	658,088	159	673,120
August .....	140	636,189	160	665,108
July .....	173	743,588	155	679,657</



# Efficiency in Hoisting and Conveying

## Economic Limits Analyzed\*

**B**EFORE trying to fix the limits for the economic efficiency under which an enterprise operates it is first necessary to come to an understanding as to the basic character of that particular type of enterprise. With regard to an enterprise undertaken for profit, the case is simple as such an enterprise is concerned only with a favorable showing on the balance sheet. With respect to a port the question must be considered differently. For a port does not serve its own ends, but is always a secondary undertaking for the service of transportation.

In a port serving general traffic the technical installations and system of organization are not arranged primarily with profit in mind, but rather with the view to the multiple demands of the traffic, the successful promotion of which is to a large degree determined by the economic entity represented by the port activities.

Taking under consideration measures for technical systematization in such a case the limits are not to be found at the point where the balance of the port undertaking, because of such systematization begins to be unfavorable, but rather at the point where through increased technical systematization the degree of success is greater than the degree of systematization. Therefore the lim-

its of efficiency in such a case cannot be simply indicated in so many figures, but can only be drawn through a thorough experience and working knowledge. It must be realized, however, that to exceed this limit would be just as economically unsound as would the failure to approach it as closely as possible. The common viewpoints with respect to two of the most important activities in port traffic—hoisting and conveying—will be treated here.

Thorough mechanization of many branches of industry through the use of conveyor equipment, which has eliminated human labor to a large degree, is unthinkable as being applicable to port operations. Naturally some goods are better adapted to mechanical handling than others; thus all freight may be classified under two heads "bulk goods" and "package goods." The flow of grain from the oceanship to the river vessel, from the railway to the silo-warehouse, and from this again by pneumatic means into the various land and water transportation media, the unloading of coal, ores, fertilizer-salts and similar commodities with grabs, lifts or conveyors, and even the similarly scientific handling of package goods as for example sacked goods, bananas and so forth, for which continuous conveying apparatus is often employed—all very strongly remind one of the working methods of modern industry. Nobody, today, would advocate hand labor for these commodities. The suitability of mechanization in such cases cannot any more be doubted,

and the efficiency limits in these as well as in other continuously operated undertakings can easily be computed in a purely arithmetical manner.

The handling of package goods, on the other hand, is characterized by a lack of continuity. Therefore this activity makes the greatest demand upon a scientific treatment of its problems.

### Hoisting In Cargo Handling

With respect to hoisting, in loading and unloading operations is perhaps well to limit oneself to the more complicated aspect, that is, the operations taking place at the quay-side as distinct from such as are carried on with vessels moored out in the harbor—a method not used in America and other places.

The question then becomes the problem "crane" considered from the standpoint of economic efficiency.

The first question as to whether cranes should be employed, or not, might be held surprising by one not knowing the equipment of many ports outside of Europe. One might ask: How should package goods be unloaded from ocean-vessels, then, if not with cranes? It is only to us Europeans that the use of cranes seems so matter-of-course. To others it is not so, by any means. It seems logical to them that a ship should use the gear which it carries for the purpose of operating where it is not possible to go alongside the quay.

In Hamburg only about 30 per cent of all goods is handled at the quay by means of cranes. Even

\*Abstract of article by Herr Bottcher, director of the Port of Hamburg, in the *Der Schiffsfrachtendienst* for Feb. 28, 1931. Translated by Alf W. Nelson, Bureau of Operations, United States Shipping Board.

though the rest is bulk-goods for the greater part, still appreciable quantities of package goods are handled by means of ship's gear. The duplication of handling gear at the quay, through the equipment of cranes in addition to the ship's own gear might be thought strange, but there is an actual basic need for this in the interests of efficiency.

Also loading and unloading exclusively with ship's gear over wide quays having one or more railroad tracks in front of the quay sheds is quite possible, technically, by means of simple and economical facilities. This is also borne out throughout the practice of the whole American port industry. When in spite of this, cranes are being used in all European ports and most of the others, and they are constantly being developed to a higher degree of serviceability and perfection, it would seem necessary to ascertain the reason.

The reason is easily found in all harbors where river navigation and harbor barge traffic play an important part in the port activities and also where change in water-levels is considerable. Both of these factors are present in the majority of European harbors, while for most of the North American harbors this is not the case. River navigation is very little developed, at present, in the United States. Harbor barge traffic usually plays a considerable role only in those American ports where the change in water-levels is small, as for example in New York. There, barges may be loaded and unloaded simply by means of trucks.

While most of the American harbors have the advantage of negligible change in water-level some do not have this advantage. In the ports belonging to this latter category, the fundamental renunciation of cranes has been amended by the adoption of highly complicated and scarcely efficient media (lifts at the quay edge) or else traffic by barge has been done away with entirely. This gives rise to frequent shifting of ships from one pier to another, sometimes for the sake of small quantities of cargo, or else a circumstantial reshipping via harbor belt line, either of which can scarcely be satisfactory from the point of view of efficiency. Furthermore, the lack of cranes for loading or unloading the ocean vessel necessitates adequate equipment of winches and booms at each hatch. This is the case only with vessels in the North American traffic. But even vessels equipped most adequately in this manner cannot be operated at the same rate without the aid of land cranes as with them.

Even if it is admitted that the American workmen with their great physical efficiency may perform as much or more with their system without cranes, as the European system with cranes, still it is not possible with the American system to

increase the number of gangs at the ships to the extent done in modern European ports and to work simultaneously at the quay and alongside. It is questionable if the greater performance per gang in America can compensate for the smaller number of gangs possible.

It must furthermore be concluded as positive, that the crane working together with the ship's gear, and even without the latter, enables a quicker clearance of the ship and at the same time promotes a more intensive utilization if the port installations, at least with the labor conditions existing in Europe.

The limited equipment of most vessels possessing hoisting facilities, that is, all those which are not obliged to use craneless piers and quays according to American pattern, need not be considered as an unchangeable fact. It is possible to contemplate the shipbuilding industry making ever-increasing changes in this connection. But if the quays and piers then also should be equipped with cranes, the limits of efficiency would be exceeded—if all the special premises of the traffic as river navigation, barge traffic, change in water level, outboard discharging, etc., are to be considered—and the installation of cranes effected only show as a result an increase in speed of handling.

There is no practical need for increased speed in handling if the ship has to lie idle in the port just the same, because of her sailing schedule or if the receiving capacity of the quay installation is exceeded be-

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THE real significance of this article lies in the fact that it clearly shows the necessity of intelligent study of all the factors surrounding every cargo handling problem. This message is directed to the manufacturer and seller of all types of mechanical equipment for cargo handling as well as to the steamship owner and those who for him are directly responsible for loading and discharging ships. By a mutual understanding of each problem it is evident that the economics of the situation will be better served to the benefit of both user and seller of mechanical equipment. For best results it is necessary that the facts be thoroughly developed and that they be faced without fear or favor.

Editor's Note.

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cause of a too rapid unloading. Such situations are quite possible and therefore the question as to the indispensability of cranes from the standpoint of efficiency cannot be answered off-hand.

#### Transportation Facilities Improved

As it was emphasized in the beginning that the discussion was to be limited to package goods consideration must be given to the special needs of this type of cargo relative to the matter of nearby transportation. Upon unloading package goods cargo it must not only be transported between the crane to the place of storage, but must also be sorted according to marks. Here, lies the chief obstacle to a ramified, efficient and justifiable mechanization.

Human capacity for work is entirely inadequate in terms of the efficiency desired in transportation, and human capacity considered as results of the components "power" and "reason" is without a doubt not satisfactorily utilized. However, there should be enough purely technical possibilities to remedy this condition: We dominate the technique of the tramrail, the belt conveyor, and other continuous transportation media sufficiently to apply them to at least a large share of the package goods at the quay. Projects of this nature have been planned, discussed and for the most part discarded, though in a few instances brought to completion without any appreciably satisfactory results as to efficiency.

The reason for this is: Although almost every package not too large or too heavy, can be continuously transported, mechanically, nobody has yet been able to invent a sorting-machine for package goods, such as is found for countless kinds of materials in other industries. For, reading the marks and choosing the correct pile can be done only by men. One might, nevertheless, suppose that after the sorting according to type of goods and, subsequently, according to individual mark, the transportation to the pile could be effected by means of a permanently built system of continuous transportation facilities. Meantime all previous attempts in this direction must fall short of the limit of efficiency.

This leaves only the motive unit transportation media, and their mechanization, as we know, is not only feasible, but has been accomplished, to a large extent. Frequent technical notices have appeared in this periodical about electric and gasoline trucks and hoisting trucks, a happy combination of transportation and piling facilities, as well as about different kinds of purely lifting apparatus.

The question here becomes: how the limits of efficiency should be sought for them as against the hand trucks and piling by hand.

# Larger Use of Fibreboard Case in Foreign Shipments

By Capt. Kristen Tvede

A SUCCESSFUL merchant marine is a very important factor in the development of foreign trade and specifically so because of the service rendered to shippers in the delivery of products expeditiously, at a minimum cost and in good condition. Correct and economical packing is therefore a matter of real concern to both the shipowner and the shipper. In this connection the activities of the Export Fibreboard Case association in its efforts to promote the use of economical and efficient packing of products is a direct aid in satisfying the customer and hence in building up trade. By calling attention to superior methods of packing at minimum cost this association is rendering a service to the entire export and import trade in helping to retain present markets and opening up new ones.

Steamship companies engaged in foreign trade have watched with interest the development of the fibreboard case for export and import shipments. Since they are the carriers, these companies are concerned in the development of better methods of packing. Knowing the importance of satisfactory packing in maintaining good relations with the shipper and consignee, some steamship companies have counseled shippers to use the high standard fibre cases turned out under the rules of the association. This has been done for the purpose of protecting the shipper's product while in transit because these steamship companies in their experience have found that such containers are better or just as good as those made of wood, while they are more easily stowed and handled.

The popularity of the fibreboard case for export and import shipments is steadily increasing, particularly so for canned goods and raisins. It is no longer unusual to find shipments from abroad, including the Far East, packed in such containers where formerly only wooden cases were used. Shipments in perfect condition, steadily increasing in number and size, now arrive at East coast ports from the Pacific coast packed in fibreboard cases for reshipment to destination abroad.

Handling of fibreboard cases is simple and requires no extra precaution or gear. Only intelligent handling and stowage are necessary. The platform sling is now universally in use on all steamship terminals and the

only thing to be considered is a proper spreader with correct length of bridle to keep the horizontal and vertical pressures within reasonable limits for the particular commodity handled. This can easily be done as may be seen by referring to the accompanying table in which the vertical and horizontal components of pressure are given for varying angles made with the horizontal using different lengths of bridle. A simple relation exists between the length of the bridle and the length of the platform and good results are obtained when the bridle is equal to the length of the platform plus the height of the load.

From the accompanying table it will be noted that at a 60-degree angle the bridle is the same length as the platform sling, which in this case happens to be 4 feet wide by 6 feet long. As the angle with the horizontal increases, the length of the bridle rap-

panying illustration it is clear that the length of the bridle can be shortened by using a spreader shackled to the cargo falls while at the same time maintaining the same angle with the horizontal and consequently the same pressure.

When fibreboard cases are used, an even floor in the ship and on the terminal should be provided. Dunnage should be free of nails and should not be permitted to overlap. Fibreboard cases and wooden cases should not be stowed together. They should be separated by paper or other inexpensive separation material. In general cargo trades it is considered good practice to use one portion of the hold for fibreboard cases and another for wooden cases, whenever practicable. Heavy fibreboard cases should be stowed in the bottom and light ones on top, just as is customary practice with wooden cases.

The fibreboard container is easily coopered and the work is simpler and cheaper than for the wooden case. A brush, a can of silicon of soda and some adhesive paper is all that is required to make the most abused case as good as new. No boards, hammer and nails are required.

No simple formula can be found for increasing our overseas trade, but this

## Finding Bridle Length for Platform Sling

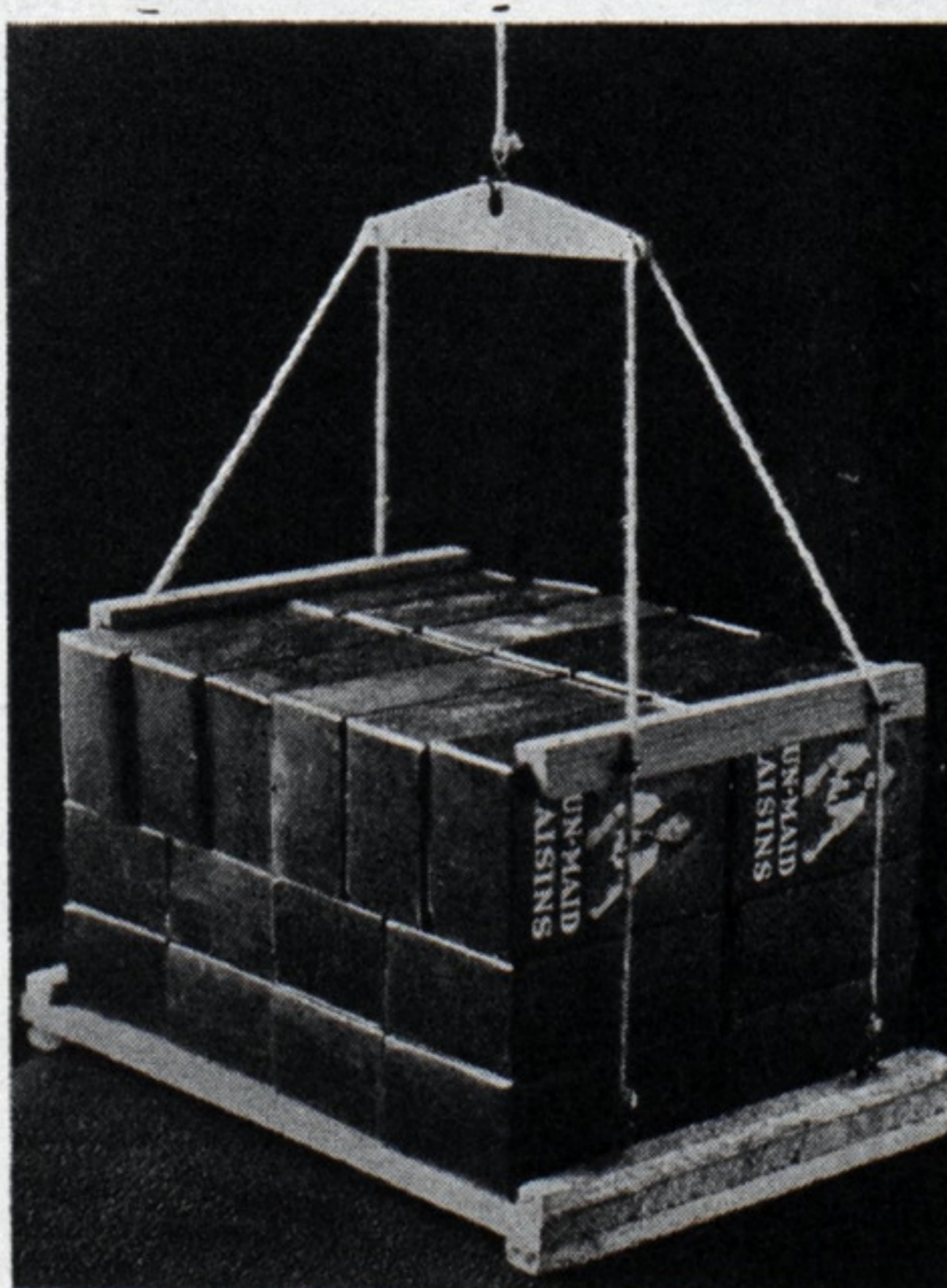
Platform Length-Ft.	Load Pounds	Bridle Length		Horizontal Angle-Degrees	Press. Lbs. Vertical	Press. Lbs. Horizontal
		Ft.	In.			
6.....	2000	4	3	30	2000	1524
6.....	2000	5	3	45	868	882
6.....	2000	6	0	60	316	504
6.....	2000	9	0	71	125	275
6.....	2000	12	0	75	87	205
6.....	2000	15	0	78	67	162

idly increases, so that at 78 degrees it is two and one-half times the length of the platform sling. To the bridle lengths given in this table must be added the estimated height of the load on the platform sling. In the accom-

panying illustration it is clear that the length of the bridle can be shortened by using a spreader shackled to the cargo falls while at the same time maintaining the same angle with the horizontal and consequently the same pressure.

should not deter us from making use of each helpful step in reducing costs and creating good will. The efforts of the Export Fibreboard Case association in standardizing quality of containers and promoting their use, therefore, deserves the recognition and the support of everyone interested in foreign trade.

Since the best interests of the shipper are of vital concern, the association regularly furnishes out-turn reports to those using fibreboard cases. When these reports are compared with the reports given at the time each shipment was stowed, the shipper has a complete and reliable history of the handling of his shipments. What shipper would not be glad to know accurately how his shipment had fared in transit and delivery to his customer? This is probably the first time such a service in an organized and orderly manner has been available for shippers in international commerce.



Type of Bridle for Cargo Protection

H. H. LaMent, vice president of the Sharples Specialty Co., Philadelphia, announces the appointment of Carl J. Lamb as district manager, New York.

# Useful Hints on Cargo Handling



**A**N IMPROVED method of handling pulpwood has been devised by F. H. Weeks, president of the Weeks Stevedoring Co., New York. It is for use when the wood is transferred from one carrier to another. It was used on over 100,000 cords of Russian pulpwood last year, the wood being brought to New York by ocean steamers, carried from New York to Albany by Williams line lighters and then loaded into railroad cars.

The new method consists of stowing the sticks in iron hoops about six feet in diameter holding about one cord of wood. The bundles are a little loose which makes for better stowage as each bundle settles into its place better than a tight bundle would. The hoops are made beforehand and filled in the ships hold. The bundles are then lifted by a crane and placed on the next carrier. The individual sticks are handled only once. The hoops are made of round iron, are cheap and are returned to be used again. The saving in labor is large and the speed of handling is increased as compared with the old method of handling each stick over and over. A patent covering the improved method was issued to Mr. Weeks June 9, 1931. The accompanying illustrations show how it is used.

## Pneumatic Conveyors Used

**C**OPRA is discharged economically by pneumatic conveyors at the Chalmette docks of the New Orleans Terminal Co.

Two units have been provided for working two hatches at the same time at the rate of 100 tons an hour.



New Slingload Method of Handling Pulpwood

*THIS page is being devoted to short items on all matters having to do with the more efficient turn-around of ships. These items are intended to be of a helpful nature.*

*We will welcome for this page brief descriptions, illustrated if possible, of any better or safer way of performing any function in cargo handling. Also, any questions submitted will be answered by the editor.*

The pneumatic method makes it possible to get heavier loading of box cars than when the copra was shoveled into the car and trampled under foot to pack the copra down in the car. This trampling of the copra was possible only when the load was low in the car. With the pneumatic method the copra is stowed to the roof of the car. The force with which the copra is blown into the car packs it compactly.

## Special Type Hand Trucks

**T**HE use of special type hand trucks for newsprint paper cut costs from 75 cents a ton to 50 cents a ton. Two wheel hand trucks were used formerly. Later, by placing the newsprint on trailers at the side-port gangplank and hauling it to head of the pier, costs were cut an additional 35 cents a ton. Two rolls are carried on a trailer. The rolls are rolled from a newsprint hand truck across a small platform on the trailers. The rolls are unloaded on to a raised platform at the head of the pier.

## Steel Hatch Covers

**T**HE British steamer LAFONIA has Macanking steel hatch covers fitted to the two forward hatches. Stowage space for the covers at number one hatch is limited so the after section was designed to hinge on to the forward section. The two sections are then rolled out and pivoted to the vertical position at the forward end of the hatch.

The cover for number two hatch was divided into two sections of unequal length with the forward section on raised coamings. This section is rolled on top of the after sec-

tion and the two sections are then rolled out approximately two feet and pivoted to the vertical position.

Grabs are used for discharging pit props at Rotterdam. Men who are in the holds bring the pit props to the hatch so that they are within reach of the grabs.

Some men in charge of cargo handling operations approach the problems of reducing costs without analytical studies. There is ample evidence that this analytical method is productive of distinct profits as compared with the rule of thumb method. The analytical method is a tool of management that spells the difference between actual profits and maximum profits.

## Color Designates Port

**A**N INTERCOASTAL line port marks cargo as follows:

Port	Color
Los Angeles	Red
San Francisco	Blue
Oakland	Black
Portland	Yellow
Seattle	Green
Tacoma	Brown

The freight is marked with these various port colors on arrival at the pier, on the lighter and sometimes in the hold of the ship. Every case or package does not necessarily have to be marked. Enough packages in a shipment are marked to identify the entire shipment upon arrival on the West coast. The packages are marked whenever it is easiest to reach them, i. e. on the pier, on the lighter, or in the hold of the ship.



Slingload of Pulpwood Using Wire Cable

# Delegates Convene to Speed St. Lawrence Waterway

**O**FFICIALS and delegates of 15 inland states and governors of eight met in Chicago, Dec. 3, with the Great Lakes-St. Lawrence Tidewater association, in an effort to speed the St. Lawrence seaway development.

How the Atlantic seaboard thus may be shifted expeditiously to the mid-continent lake ports was the subject of discussion, and a memorial was adopted urging congress to ratify a treaty with Canada, under which the international rapids section between Ogdensburg, N. Y., and Cornwall, Ont., may be developed. The memorandum of the proposed treaty at Washington calls for construction of dams there by the United States to balance the expenditures of Canada for building the Welland canal and other improvements, provisions also having been made for distributing the potential power in the international section between the two countries.

The memorial called upon the United States senate to ratify the treaty, the house of representatives to originate enabling bills, and President Hoover to help expedite the arrangements. By 1936, the resolution said, the Great Lakes harbors should be world seaports.

Col. William Nelson Pelouze, chairman of the Illinois deep waterway commission, pointed out that there are 125,000,000 tons of water freight originating in the Great Lakes annually, and that the records show that during the navigation season last year more than 100,000,000 tons passed through the Detroit river. "That is more than the tonnage that passed through the Panama canal during the first nine years of its operation," said Colonel Pelouze.

"Forty million people adjacent to the Great Lakes are land-locked," declared Colonel Pelouze. "When the St. Lawrence is open for deep navigation, cities on the Great Lakes will become ocean ports. Manufacturers and farmers of the Central states then will be on an equality basis, so far as cost of water transportation is concerned, with their seaboard competitors.

"More is involved than the saving of freight. New opportunities will be opened by this new line of communication. Between Chicago and Buffalo is the busiest inland marine traffic in the world. No public improvement promises greater benefits than the St. Lawrence seaway."

Those participating in the conference included Govs. L. L. Emmerson, Illinois; Wilbur M. Brucker, Michi-

gan; Harry G. Leslie, Indiana; George White, Ohio; Floyd B. Olson, Minnesota; George F. Shafer, North Dakota; J. E. Erickson, Montana; Warren Green, South Dakota; former governors William L. Harding and John Hammill of Iowa, and a number of others. A banquet in the evening closed the day's sessions.

A picture of Chicago, Detroit, Milwaukee, Duluth, Toledo, Cleveland, Buffalo, and other ports shifted to seaboard parity was sketched by Governor Brucker. "All that stands in the way today of this great project is 48 miles of rapids in 2000 miles of waterway," said Governor Brucker. "Can anyone visualize the stimulus that will come with direct connection for all lake ports with the great world ports?"

Governor White, of Ohio, dwelt on the possibilities of inland industrial expansion. He declared that a veritable Northwest passage will become reality. He pointed out that much of this titanic project already is accomplished, and that its completion depends on the successful negotiation of the treaty between the United States and Canada. Governor Shafer of North Dakota, asserted that the seaway will bring the Atlantic ocean, as an avenue of commerce, 1700 miles into the heart of the North American continent, transforming the Great Lakes into an inland ocean, remaking many American and Canadian cities from lake ports into seaports, and liberating 20 American states and several Canadian provinces from those burdens of distant transportation which long have stood as a barrier to the economic progress of the "inland empire."

## To Construct Terminal

For the construction of a Chicago terminal for the Illinois waterway development, a fund of \$200,000 from the Santa Fe and the Illinois Central railroads has become available through the settlement three years ago of one of the cases involving title to the old Illinois and Michigan canal lands. This fund may be used by the state waterway division only upon authorization by the Illinois legislature, which is expected soon.

Bills instructing the new Chicago regional port commission to prepare plans for a terminal to be constructed by the state waterways division at the expense of the two railroads have been introduced in a special session of the legislature now being held. It

has been pointed out for sometime by waterway experts that unless the legislature acts soon on the terminal question, barges may be using the Illinois waterway link to the Gulf before proper terminal facilities are provided.

Contracts have been awarded for the final bridge spans for the waterway project, and all indications now are that the Illinois link of the Lakes-to-Gulf project will be completed sometime in 1933.

The Chicago aldermanic committee on harbors, wharfs and bridges has recommended for passage two ordinances relating to the Lake Calumet harbor development in the Chicago industrial area as a part of the waterway project. One of these ordinances would give the federal government a five-year option on a part of Lake Calumet, about 550 acres of land and water, for the development of a transfer and terminal harbor there.

## November Lake Levels

The United States Lake survey reports the monthly mean stages of the Great Lakes for the month of November as follows:

Lakes	Feet above mean sea level
Superior .....	602.40
Michigan-Huron .....	578.34
St. Clair .....	573.46
Erie .....	570.75
Ontario .....	244.00

Lake Superior was 0.04 foot lower in October and 0.17 foot lower than the November stage of a year ago.

Lakes Michigan-Huron were 0.18 foot lower than in October and 1.50 feet lower than the November stage of a year ago.

Lake Erie was 0.17 foot lower than in October and 1.08 feet lower than the November stage of a year ago.

Lake Ontario was 0.24 foot lower than in October and 1.65 feet lower than in the November stage of a year ago.

Capt. Thomas G. Baldwin, 71, who had been a master on Great Lakes Steamers for 50 years, died Nov. 29 at his home in Chicago. He was the son of the late Capt. George Baldwin, who had sailed the Great Lakes in the early seventies. Capt. Thomas Baldwin had been identified with a number of Lake Michigan transportation companies. Before his retirement two years ago, he had commanded the steamer GEORGIA of the Goodrich Transport Co., and its predecessor, for many years.

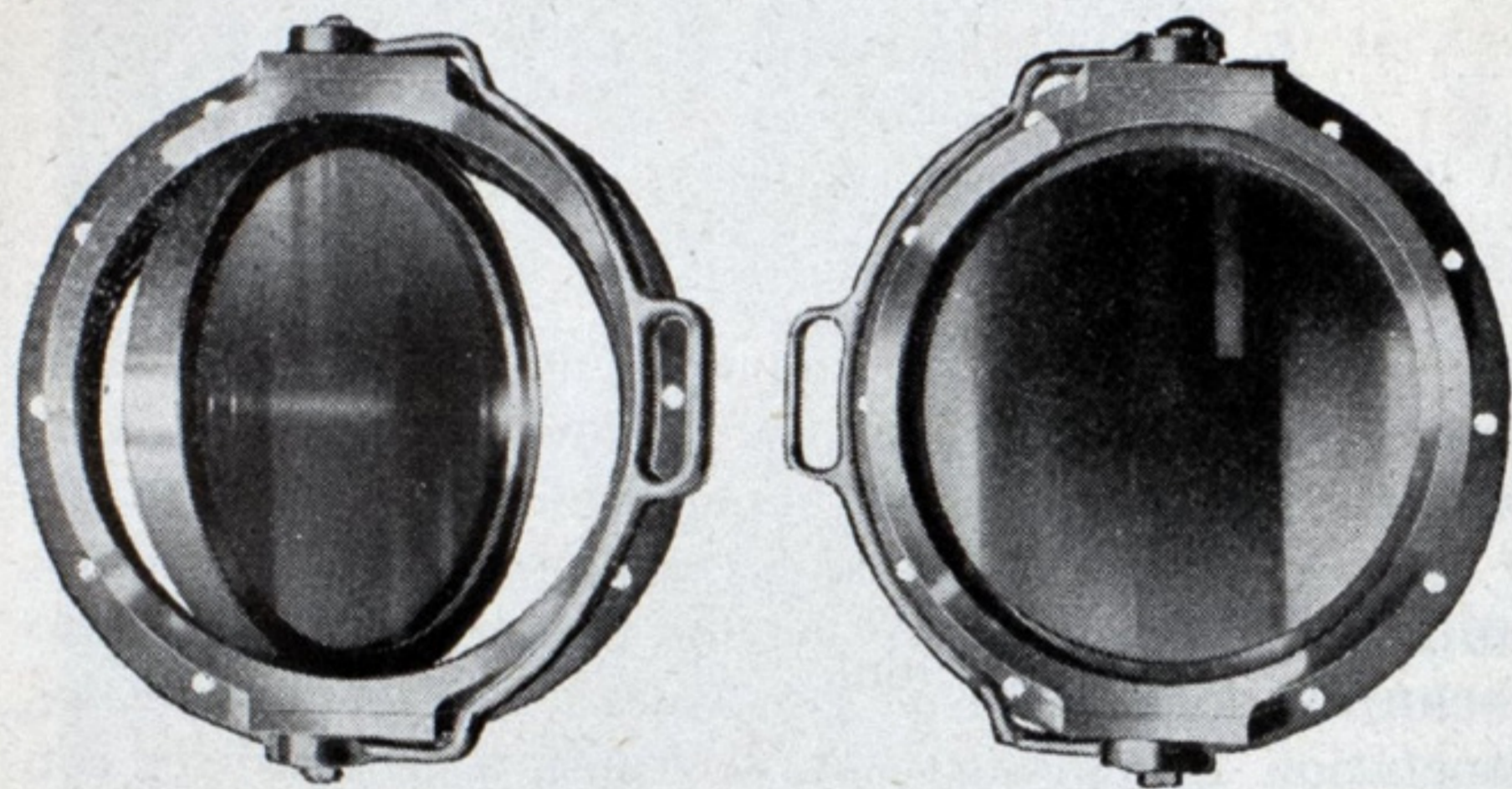
The 1931 navigation season on the upper lakes, which from the standpoint of weather and sailing had been the most advantageous in many years, closed Dec. 12 with the departure of the motorship GEORGIAN from Port Arthur, Ont., with a cargo of grain.

# Equipment Used Afloat and Ashore

## New Type of Ship's Sidelight—Unique Propelling Device Developed in Vienna—Centrifugal Sump Pump Operated on Compressed Air

**A** New type of ship's sidelight, recently developed by J. Stone & Co., Ltd., London, and manufactured and sold in the United States by the American Locomotive Co., 30 Church street, New York, is shown in the accompanying illustration.

This new Stirrup sidelight consists of two main parts, the glass-holder and the fixed frame in which it pivots. To ensure watertightness a rubber seating ring is fitted into an inwardly projecting rim on the inboard side of the fixed frame, so that as the pressure of water on the outboard side of the glassholder increases, the pressure on the rubber seating increases, resulting in



*Stirrup Pivoted Watertight Sidelight, Showing Open and Closed Positions*

increased watertightness. Instead of the usual fastening arrangements the pivoted glass-holder is brought, and held, firmly against the rubber seating by the simple operation of pushing the stirrup-shaped handle into a position flush with the fixed frame.

To open, the glass-holder is moved outwards and away from the rubber seating ring by means of semi-circular stirrup-shaped handle which is pulled forward and swung completely across the light in a semi-circular movement. This in turn operates simultaneously cams at the top and bottom of the sidelight, each cam carrying a pivot of the glass-holder. When the stirrup handle completes its travel to the opposite side of the fixed frame, the glass-holder is free to pivot. By manipulation of the handle, the glass-holder can be locked in any pivoted position or be left free to pivot. The sidelight is closed by pulling the handle forward and swinging it to the opposite side of the fixed frame, bringing the glass holder forward to the seating ring

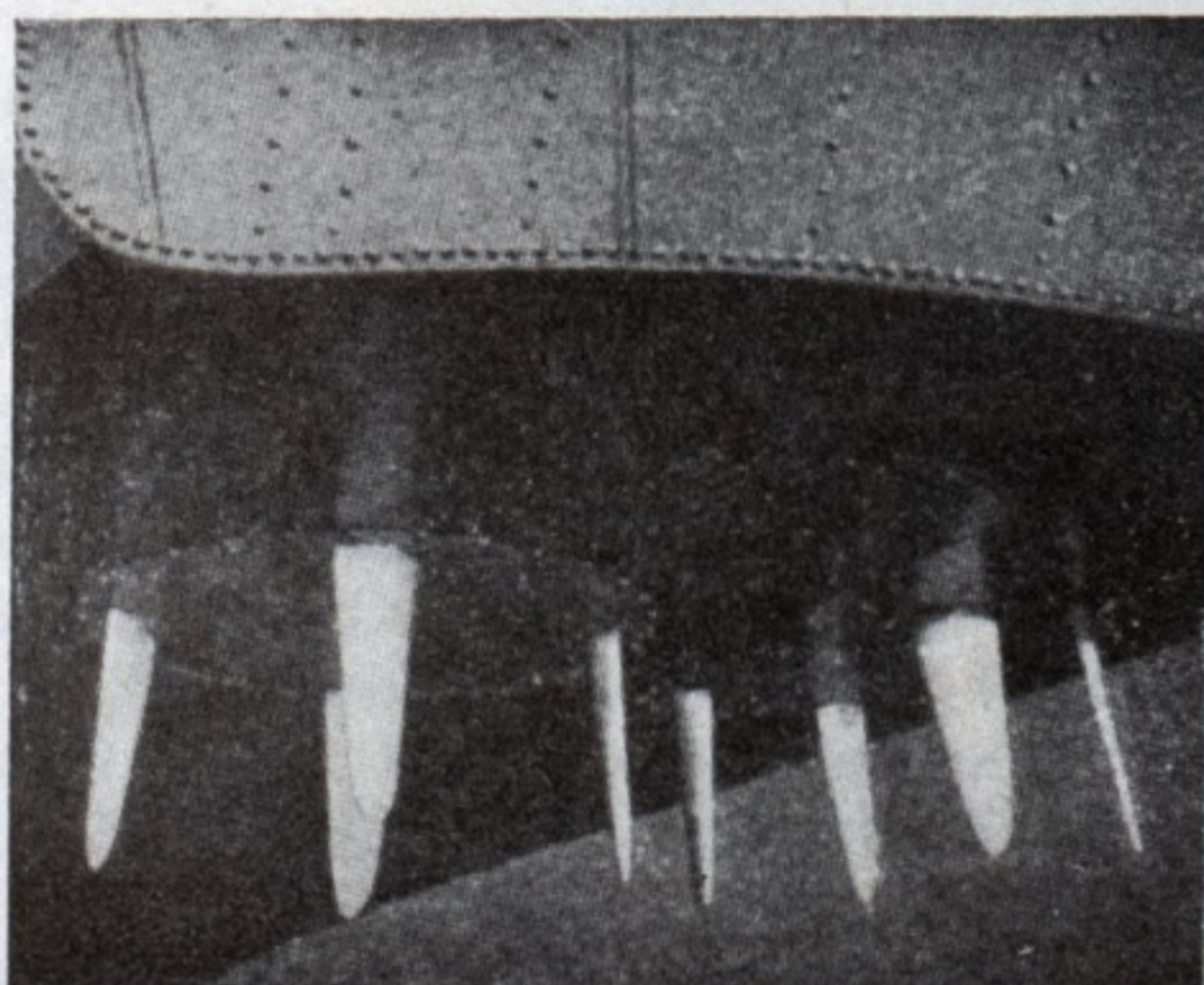
and locking it in a watertight position.

A large order has been received for the installation of this new sidelight on the four new Panama Mail liners now building at the yard of the Federal Shipbuilding & Dry Dock Co.

### Radical Design of Marine Propeller Drive

**K**KNOWN as the Voith-Schneider drive for ships, the new idea has revealed high hydraulic efficiency in tests conducted by the Vienna Marine Engineering Experimental institute. Lake Constance passenger vessels built by the German Railroad Co. are making practical application of the principle, which eliminates stern post and rudder inasmuch as it also is employed in steering the vessel. A description of the hydraulic and kinematic principles of the new ship drive appeared in the November issue of *Engineering Progress*, from which the accompanying illustration was taken. The conventional screw is replaced by a runner rotating around a vertical

axis and equipped with four mobile blades. Because the blades and the bottom surface of the runner are the only parts which come in contact with the water, frictional resistance is reduced to a minimum. It will be seen that constant hydraulic losses caused by the propeller hub, shaft bosses, etc., are obviated by this design. The propeller blades resemble in shape that of an airplane wing and operate with the rounded edge forward. Revolving about a common



*Voith-Schneider type ship propeller*

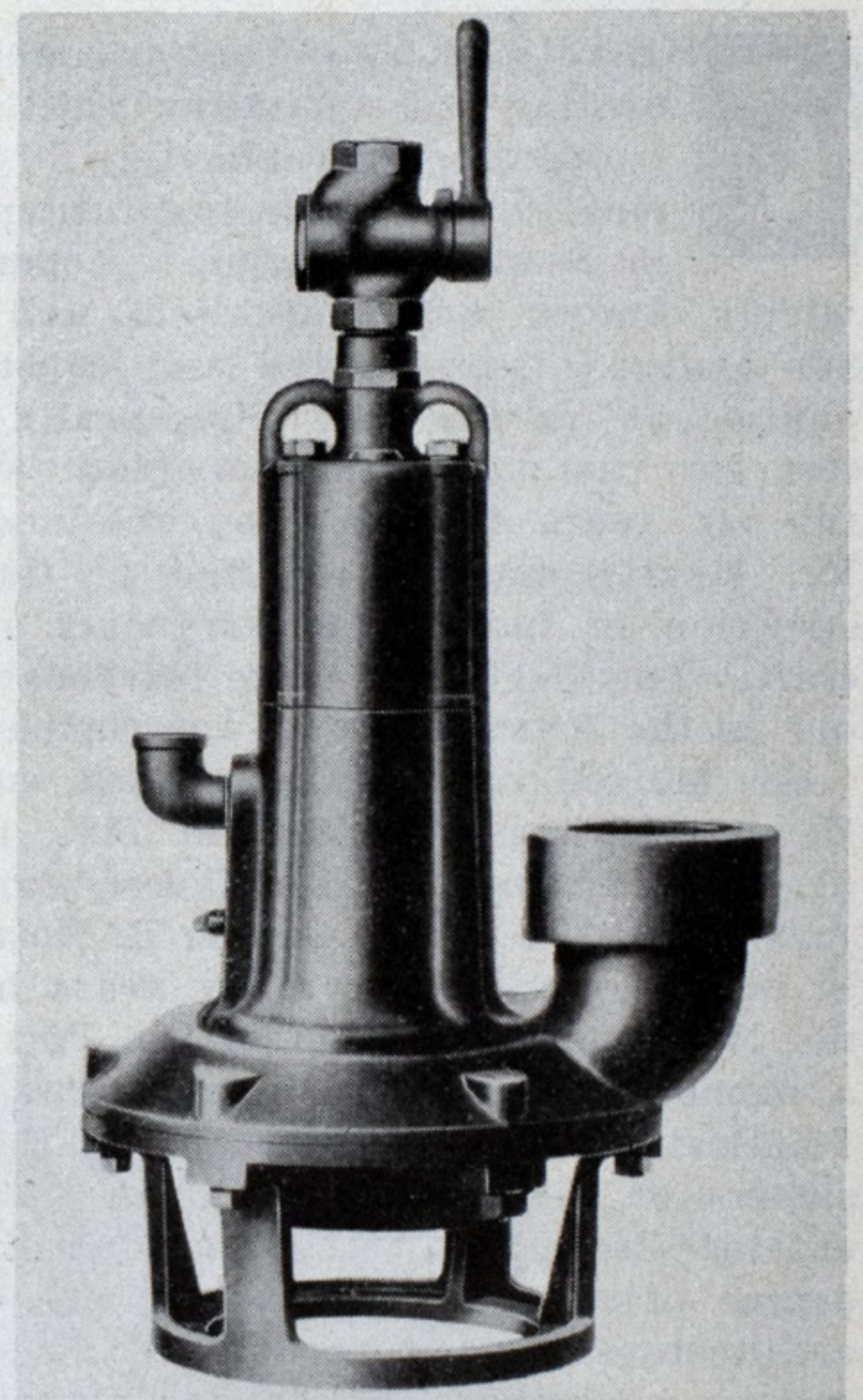
center, the blades are inclined automatically by the drive mechanism to give the most desirable thrust against the water.

To effect the operation outlined above, a mechanism has been devised which turns each blade during its rotation to cause a line perpendicular to the effective blade surface to pass at all intervals through the same point.

If the drive is placed at one end of the vessel, preferably in the customary position at the stern end, the propeller can be made to assume the function of the rudder.

### Pump Has New Features

**A** NEW centrifugal sump pump having a number of exclusive features and specifically designed for general work requiring fast and effective expulsion of water, oil and



*New Cleco-Deming Pump*

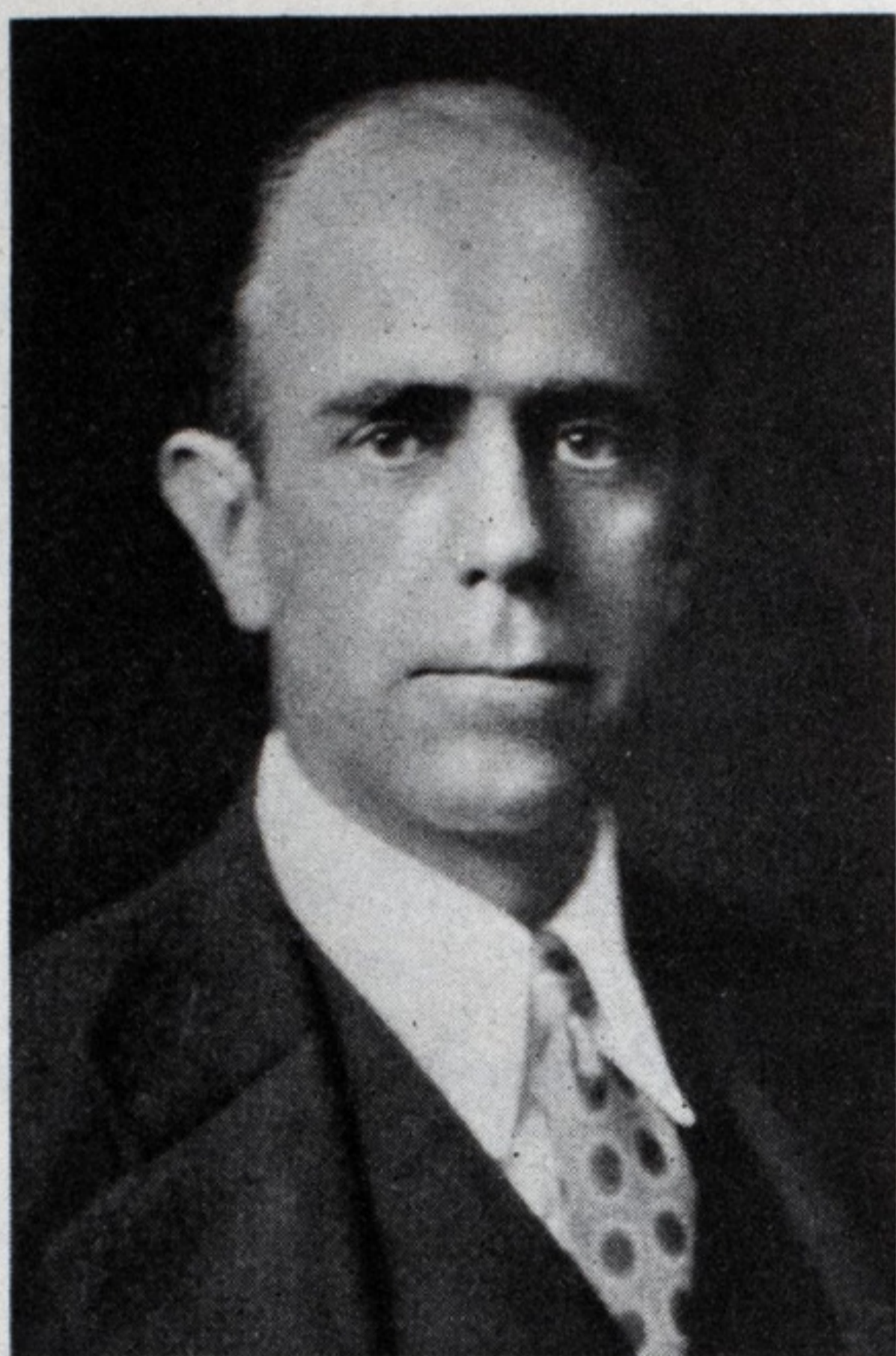
other liquids, has just been produced by the Cleveland Pneumatic Tool Co.

This pump has a compressed air operating power unit built integral with the pump housing, making a portable outfit easily handled by one man. It is compact with a low center of gravity that prevents it from being upset. The pump performs while entirely or partially submerged.

# Personal Sketches of Marine Men

Robert W. Morrell, Naval Architect and Marine Engineer

By E. C. Kreutzberg



*Photo by Blank & Stoller*

**C**OMBINES sound technical training in naval architecture and marine engineering with years of practical experience in shipbuilding and design.

**R**ECOGNIZED as an authority on tankers having designed and supervised the construction of about forty, including the two largest in the world.

**F**OR the City of New York he has had charge of the design and construction of four large ferryboats besides a number of smaller vessels.

**T**HE City of New York is among the sizable ship owning and operating entities in this country. It operates approximately 50 boats, on nine principal routes and in institutional service to islands in New York harbor. Robert Whiting Morrell, widely known naval architect and marine engineer, has charge of the design and construction of floating equipment for the city. Specifically, he is naval architect for the department of plant and structures. In the six years he has been retained in this capacity, Mr. Morrell has had charge of the design and construction of four large ferryboats and several smaller craft. The last of the large ferryboats which he brought out as the KNICKERBOCKER was completed late in October.

Mr. Morrell naturally gravitated into the marine field. He was born in Brooklyn in 1887, the son of the late Joseph B. Morrell, head of Baker, Carver & Morrell, ship chandlers. The father, Joseph B. Morrell, was well-known in marine circles; for many years he was president of the Maritime Association of the Port of New York, was a member of the board of governors of New York State Nautical school, and a member of the Board of Commissioners of the Pilots association. The younger Morrell entered Cornell university, graduating in 1909 with the degree of mechanical engineer. He specialized in naval architecture and marine engineering. During summer vacations he worked as outside machinist at Morse Dry Dock, also as junior engineer on the S. S. NEW YORK, of the American line.

In 1909 he started to work as a ship fitter at the yard of the Newport News Shipbuilding & Dry Dock Co., Newport News, Va. Successively, he became a mold loftsmen, draftsman and finally hull superintendent. In 1914 he left to become assistant marine superintendent of the Standard Oil Co. (New Jersey), with headquarters in New York. Later he became naval architect for the Standard Oil Co. (New Jersey). In this connection, during the World war, he had charge of the design and construction of about 40 tank ships, including the two largest tankers in the world, as well as the novel combination oil and ore

carrier. All of these were about 20,000 tons deadweight.

Leaving the Standard Oil Co. (New Jersey) in 1921, Mr. Morrell became marine superintendent for the Tide Water Oil Co., New York, and continued in this connection until 1924. During this period he served as chairman of a technical committee of the American Steamship Owners association which was then occupied with stability considerations and with proposed revision of shipping laws involving tonnage and measurement; it also was occupied with matters in connection with the load-line bill establishing freeboard for American ships.

In 1924, Mr. Morrell branched out for himself as a consulting naval architect and marine engineer and surveyor, specializing in tankship work, in which he is a recognized authority. In 1925 he prepared the preliminary design of the ore carriers of the United States Gypsum Co. In 1925 he also took over his present connection with the City of New York. In his work for the city, he was instrumental in the adoption of diesel and diesel-electric drive for New York ferryboats.

Mr. Morrell is a member of the Society of Naval architects and Marine Engineers, and presented a paper before the society in 1917. He is a member of the naval architects committee of the American Bureau of Shipping. He also is a member of the board of governors of the American Marine Standards committee. Several years ago he wrote a standard work on this subject of tankships, entitled, *Oil Tankers*, a revised edition of which has just been published. He has contributed other marine literature.

He resides in Brooklyn and Garden City, Long Island, with his wife and children. In 1912, he married Victoria A. Carter, daughter of the late A. G. Carter, president of the Carter & Weekes Stevedoring Co. Their children are Victoria C. and Robert Carter Morrell. The latter now is at Stony Brook school, Long Island, preparing for the University of Michigan where he will study naval architecture.

Mr. Morrell spends most of his spare time on the waters adjacent to New York. His craft is a 30-foot knockabout, a true "wind-jammer."

# Centrifugal Purification of Lubrication and Fuel Oil

By George H. Hill

IN THE selection of marine propelling machinery, reliability is the most important factor. Correct design and construction alone, however, do not insure complete reliability. Practically all propelling machinery installed in modern ships today is either a form of turbine drive or of diesel drive. In either case forced lubrication oil systems are employed, and the reliability of the main machinery in operation depends upon its proper lubrication, and the maintenance of the lubricating oil in a pure state, free from water, acid, sludge and grit.

Before the advent of the super-centrifuge, it is true, turbine and diesel propelled vessels were coming into considerable use, although the reciprocating engine drive was still prevalent. With the wider adoption of both forms of drive requiring the forced system of scientific lubrication, has come the widespread use of centrifugal purifying not only the lubricating oil but also the fuel oil for diesel engines. The reliability of the main engine, with reduced repair costs, has not only been improved by assuring proper lubrication, with the super-centrifuge, but lubricating costs have been considerably reduced thereby, since it is no longer necessary to completely renew the oil in the system periodically, but only to add the slight make-up required due to vaporization, or represented by the sludge and emulsion taken out of the purifier.

The simplest way to appreciate the use of centrifugal force for oil purification is to compare it with the gravity settling process formerly used ashore, since centrifugal force is exactly comparable with gravitational force, except in the intensity of its action. The centrifugal force employed in a super-centrifuge is equal to many thousand times the force of gravity, and several times that employed by other types of oil purifiers.

## Removing Impurities from Oil

If a charge of lubricating oil containing water and solid impurities be put into a steady settling tank, it will eventually settle into a layer of dirt on the bottom, then a layer of water or emulsion, and the layer of oil on top. Efforts to draw off the dirt and water will disturb equilibrium to some extent, so that some dirt and water

will remain, and some oil will be drawn off with that water which is withdrawn.

With the use of the centrifugal purifier, whereby a whirling force many times that of gravity is utilized, not only is much quicker separation obtained, but one which is more complete since this force will break emulsions that remain stable under the influence of gravity alone, and which results in absolutely clean oil, without loss. Gravity settling systems are therefore out of the question for successful marine use.

In considering utmost reliability of a lubricating system, it is essential that the purifier which is to assure the reliability of the system must be as mechanically simple and reliable as possible, and all-important that it may be disassembled, cleaned, and reassembled in the shortest possible time. It must, of course, be selected so as to have ample capacity for the system it is to serve.

The super-centrifuge has been selected for over 75 per cent of the marine lubricating and fuel systems which depend upon centrifugals to assure maximum reliability of the system with minimum cost, primarily because of its inherent reliability, simplicity and ease of cleaning. It consists of a scientifically designed, light weight, small diameter, tube-type

bowl, suspended from ball bearings by a spindle, and driven by a motor through a belt. The bowl, which is of heat treated high carbon steel, polished inside and out, is dynamically balanced during construction, and given a 50 per cent over-speed run before shipment. Due to the particular design of the super-centrifuge, it is possible to stop the machine, clean the bowl and have it in service again at full speed, within 15 minutes. There is no wearing part which cannot be replaced in 20 minutes by a member of the ship's force, while if all the wearing parts of the machine were to be replaced, only approximately 50 minutes out of service would be required.

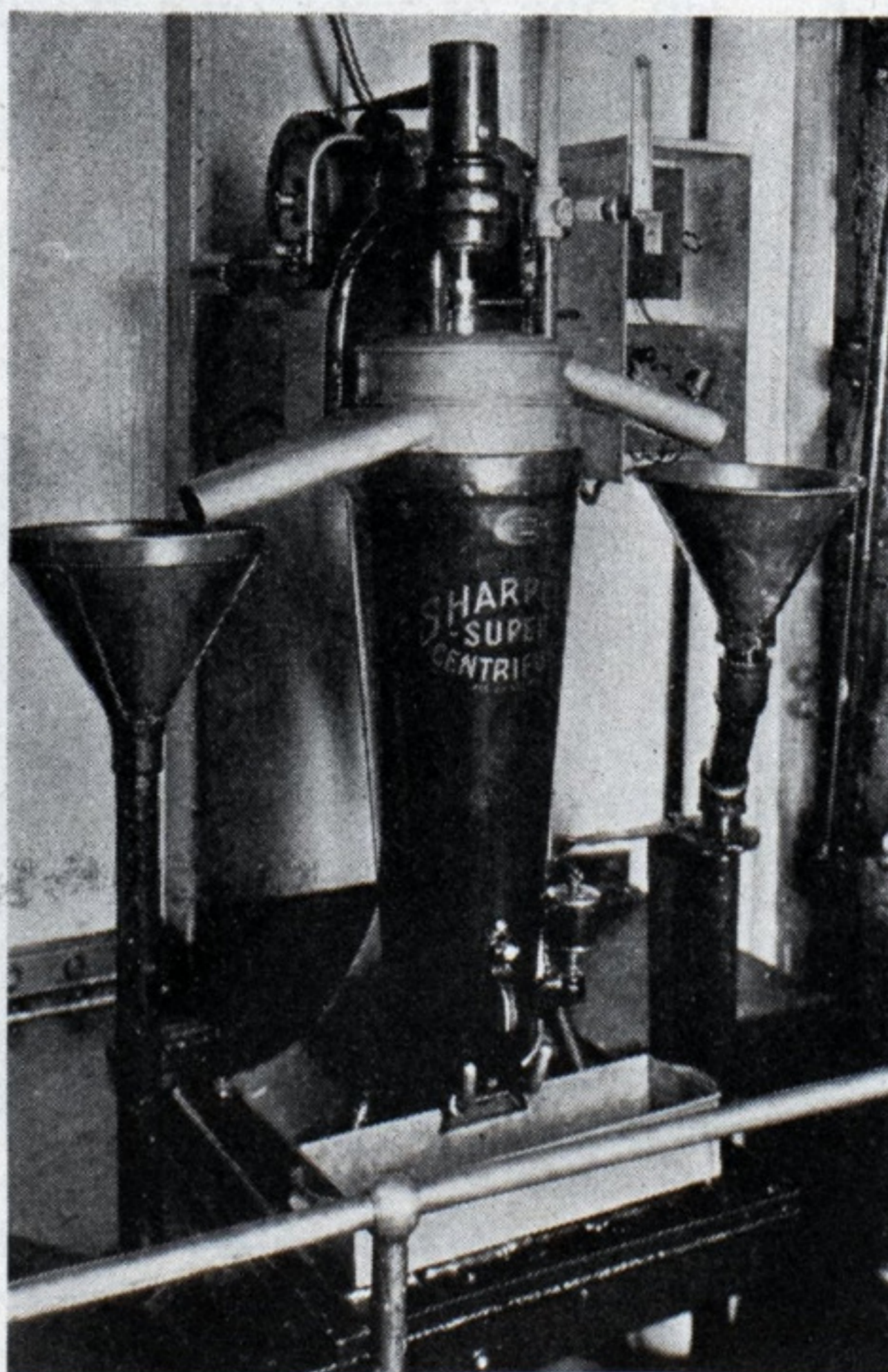
## The Continuous By-Pass Method

The actual practice in purifying turbine lubricating oil is to use the continuous by-pass method, since in most marine turbine systems the circulation of oil through the system is usually at a high rate. With the continuous by-pass system a part of the oil is regularly drawn from the oil system, passed through the centrifuge and then returned to the system. To assure complete renovation of the entire system the oil is purified in a batch, when the vessel is in port.

On diesel ships the lubricating oil is usually purified by the continuous by-pass method, as generally employed on turbine vessels. The super-centrifuge has found widespread use in purifying the fuel oil aboard diesel ships, in recent years. Especially where cheaper oil which is heavier and dirtier, is used. Diesel fuel, regardless of how carefully it is handled, contains besides water, considerable dirt, free carbon, grit, scale, rust, etc. All such solid impurities cause nozzle plugging, valve cutting, cylinder scoring and piston ring wear, with consequent frequent shut-downs and high maintenance costs. There are many cases on record where the reduction of maintenance cost has paid for a super-centrifuge in a single voyage. It is quite common for the solid impurities removed from a 24-30 Baume gravity fuel oil to average one-quarter pound per barrel.

While to some extent overlooked, the same good reasons apply for purifying the lubricating oil in forced feed systems on high-speed reciprocating engines, as apply to turbines or diesel engines. It has recently been decided by one of the Great Lakes shipbuilders to use forced lubricating systems, with centrifuges, to serve the marine reciprocating engines built for future service, and serious consideration is being given to converting existing wick feed systems on vessels in service, to forced lubrication.

It is, of course, obvious that the lubricating oil from the forced feed systems of auxiliary turbine generators or auxiliary diesel generators can, and should be, easily put through the purifier periodically on the batch system.



*Super centrifuge for purifying turbine oil on S. S. Maui of the Matson Navigation Co.*

The author, George H. Hill, is marine sales manager of the Sharples Specialty Co.

## Electricity During 1931

(Continued from Page 29)

launched and at the fitting out dock at the turn of the year.

The RANGATIRA, first channel steamer, built for the Union Steamship Co. of New Zealand, for service between Wellington and Lyttleton, was commissioned during August. This ship which is twin-screw has a length of 400 feet, a beam of 58 feet, and a power rating of 13,000 shaft horsepower. She has a service speed of 17 knots when operating with one generator and 20 knots when operating with two.

Construction of the turbine electric propelled super ISLE DE FRANCE, a liner of approximately 1000-foot length, is progressing in accordance to schedule in France. This ship is to represent France's entry for the blue-ribbon pennant of the North Atlantic, and the laurel for being the most magnificent passenger liner of modern times.

The main power plant is to consist of four turbine generators each serving a single propeller shaft under maximum power and speed conditions. Provision is to be made in the switching arrangement for operation of all propeller shafts at reduced speeds with a reduction in the number of main generating plants in operation to correspond to the powering demands. Elaborate provision is also being made for complete auxiliary electrification.

The lighthouse tender LINDEN, the keel for which was laid during the fall of 1930 was completed during 1931, and successful trials were held in July. The keel for the sister ship COLUMBINE was laid in April and the ship launched in July. These are the first vessels of their type to adopt diesel electric drive. The main power plant on each vessel consists of two diesel engine driven generators each rated 100 kilowatt, 250 volt, 400 revolutions per minute, and one 240 horsepower, 350 revolutions per minute, 500 volt double-unit motor.

The WHITE FLASH, diesel electric tanker of all-welded construction, was completed during the year by the Sun Shipbuilding & Dry Dock Co. for the Atlantic Refining Co., owner of the largest fleet of diesel electrically propelled tankers in the world.

The power plant consists of three diesel engine driven generators each rated 105 kilowatts direct current, 125 volts, and one propulsion motor of the shunt wound type, rated 375 horsepower, 375 volt, 150 revolutions per minute.

The first large diesel electric drive application using alternating current machinery is being made on a self-propelled, combination hydraulic and clam shell dredge of the tunnel stern propeller type, for the Sternberg Dredging Co., St. Louis. The main power plant consists of two diesel engine driven alternating current generators each rated 2300-volt, 3 phase,

60 cycle, with direct-connected exciters. The two propellers are driven by 300 horsepower, 600 revolutions per minute motors through belt drive. The main dredging pump is driven by a 1600 horsepower, 360 revolutions per minute adjustable speed wound rotor type of induction motor, and the cutter by a motor of the same type rated 300 horsepower, 900 revolutions per minute. A motor generator set of 400 horsepower capacity is used to drive the following auxiliary direct-current motors: One 200 horsepower series wound hoist motor, one 100 horsepower shunt wound swing motor and one 50 horsepower tag line motor.

Construction was started on the propelling equipment for one 640 horsepower diesel electric drive tug for the United States navy. The equipment is to consist of two diesel engine driven direct current generators each rated 260 kilowatt, 250-volt, 300 revolutions per minute, and one double unit propelling motor.

### Diesel Electric Drive in Europe

Diesel electric drive is becoming more favorably looked upon in Europe and progress is to be noted in England, Germany and France. As in the United States the installations are made in connection with boats requiring flexibility in powering arrangement and low standby losses.

In England the Metropolitan Vickers Electrical Co. Ltd., completed the equipment for the LOCK FYNE, a diesel electric propelled passenger and cargo boat rated 1340 shaft horsepower.

In Germany the Allegemeine Electricitats-Gesellschaft completed the electrical equipment for three diesel electric propelled boats as follows: PASSAGE D'EAU DE SOUBISE, a quadruple screw ferry, rated 200 shaft horsepower; PASSAGE D'EAU LA TREMBLADE, a quadruple screw ferry, rated 300 shaft horsepower; HUSSAR, a twin screw fourmast bark rated 2700 shaft horsepower.

In France the Generale de Constructions Electriques Et Mechaniques (Alsthom) completed the electrical equipment for the ALERTE, a diesel electric powered pump boat for the chamber of commerce of Marseille.

### Use of Turbine Gear Drive

Construction was started during the year on the turbine-gear propelling equipments for four-twin screw, combination passenger-cargo boats, which are being built by the Federal Shipbuilding & Dry Dock Co. for the Panama Mail Steamship Co. The propulsion units are of the cross-compound double reduction gear type, each rated 6000 shaft horsepower, or 12,000 horsepower per ship. These ships are to operate under modern steam conditions, the pressure and temperature at the boilers being 400 pounds gage, and 750 degrees Fahr. temperature, respectively. The auxiliary direct-current generators on these ships are to be driven off of extensions of the intermediate gear pinion

shafts, thus producing the power at the high efficiency of the main unit, standby sets being provided for maneuvering and port conditions.

All of the large turbine electric propelled ships, built and building, have demanded large quantities of auxiliary apparatus in their complete electrification programs. Ships having other types of propelling equipment have also, in most cases, adopted electric auxiliaries. The year has also seen a continuous advancement in the uses to which applied. Ranges, bake ovens, miscellaneous galley equipment, stateroom heating, individual pantry refrigerating systems, and water cooling systems are all tending toward complete electrification on modern ships.

Among the larger applications the above-deck-cargo winch equipment on the S. S. PRESIDENT HOOVER is of especial interest. These winches are of the modern, high-speed, single-gear type and driven by specially wound slow-speed motors rated 35 horsepower at 300 revolutions per minute. The slow speed of the motor with relation to the line speed reduces the accelerating losses to a minimum and at the same time makes the equipment much more responsive. Four of the winches which serve the 30-ton booms are provided with compound gearing, giving two different gear ratios, and thus enabling the same motors to be used for either light or heavy drafts. The control is of the full automatic type giving four speeds in the hoisting direction, and five speeds in the lowering direction with dynamic braking. Shoe type solenoid brakes are fitted to the end of the motor shafts for the holding of the load when the control lever is returned to the "off" position. The master switches are so placed on the deck that one stevedore can handle two winches on the burtoning system, and at the same time have a complete and unobstructed view of the loading or unloading operations.

Auxiliary electrification has also invaded the fishing trawler fleet operating off the New England coast. Two trawlers, the EBB and FLOW, had installed motor driven trawling winches of both a special electrical and mechanical design, enabling the boats to continue operations under much more adverse weather conditions.

### Popularity of Electrical Applications

It is evident that the continually increasing number of ships which are making use of modern electric methods is due alone to the solid groundwork and care which was exercised in the earlier stages of its development. Probably the best evidence of a popular ship is the fact that it is a paying ship. Electric propelled and electrically equipped ships have been in service a sufficient length of time to demonstrate that from every point of view, no prospective shipowner can afford particularly where passengers are involved, not to consider the full benefits of modern electrification.

## Talamanca Completed

(Continued from Page 21)

feet, and generate steam at 350 pounds pressure and 230 degrees Fahr. superheat. They are fitted for oil burning under either forced or natural draft, and are equipped with Diamond soot blowers.

For forced draft, which is on the closed ash pit system, there are four American Blower Co.'s double width, double inlet fans, each rated at 10,000 cubic feet per minute and driven by a 7½ horsepower motor. These fans are located in the boiler room at the firing level, two on each side, and are arranged so that each boiler has its own forced draft fan; the discharge ducts are connected across the front of each battery of boilers and dampers fitted, so that in case of a breakdown of one of the fans the fan on the opposite side will serve two boilers. Each boiler is fitted with Todd fuel oil burners, and there are three Todd fuel oil heaters. An Ingersoll-Rand motor-driven air compressor and tank is installed in the boiler room for use with the boiler tube soot blowers.

### Attention Given to Feed Water

The high steam pressure requires careful attention to the feed water. Only distilled water is to be used and two special tanks are provided for that purpose of combined capacity to fill two boilers to steaming level. For replenishing the distilled water supply there is installed an evaporating and distilling plant consisting of two Davis Paracoil evaporators, each having a capacity of 47 tons in 24 hours, and one Davis Paracoil distiller having a capacity of 10,000 gallons in 24 hours.

Two Alco Products, Inc., feed water heaters are arranged to operate in series and are capable of raising the total temperature of the feed water from 110 degrees Fahr. to 300 degrees Fahr. A feed water grease extractor, supplied by Davis Engineering Co., is fitted in the discharge from the feed heaters. There are two centrifugal main feed pumps, driven by Terry turbines supplied by the Kearfott Engineering Co., which are operated with superheated steam only, and one vertical simplex auxiliary feed pump which is operated with desuperheated boiler pressure steam.

For lubricating oil service there are two Westinghouse vertical centrifugal pumps of 200 gallons per minute capacity, driven by Westinghouse turbines, and two Griscom-Russell coolers each capable of cooling 120 gallons of lubricating oil from 142 degrees Fahr. to 107 degrees Fahr. per minute. The used lubricating oil is purified and reclaimed by means of a motor-driven DeLaval centrifugal lubricating oil

purifier with which is connected a Davis vertical heater.

Among other engine room auxiliaries there are one motor-driven centrifugal ballast pump, one vertical simplex pump for ballast and bilge service, one vertical duplex fire and bilge pump, two motor driven centrifugal pumps for sanitary and fire service, and a reciprocating pump for handling oily bilge water. A 45-ton Bethlehem oil and water separator is provided through which the oily bilge pump (and at option all the ballast and bilge pumps) discharge to avoid pollution of harbor waters. For fresh water service there are a reciprocating pump and a motor driven centrifugal pump for cold water, and one motor driven centrifugal pump for hot water. A Davis Engineering Co.'s heater is fitted for heating fresh water for service throughout the ship. All pumps not otherwise indicated are Warren Steam Pump Co. make and all motors are General Electric.

Special instruments for checking the performance of the machinery include a condensate motor for measuring the steam consumption of the two turbines, recording thermometers for stack temperature, feed water temperature and turbine exhaust temperatures, and large dial gages for the forced draft blowers which can be read from any point on the fireroom floor. All important temperature readings are recorded by Taylor Instrument Co.'s dial thermometers.

### The Auxiliary Electric Plant

For supplying auxiliary power there are three geared turbine direct current generating sets, each set having a five stage turbine with reduction gears to reduce the revolutions from 4779 to 900 per minute, and a generator rating of 500 kilowatts with a voltage of 120 to 240. Two compound wound rotary balancer sets are fitted, each capable of supplying continuously 300 amperes neutral current for the three-wire 120/240-volt lighting system and arranged for parallel operation. The auxiliary generating sets and the balancer sets were also furnished by the General Electric Co.

For use in case of emergency there is a 25 kilowatt General Electric set driven by a Weir-Kilby gasoline engine, located in a steel enclosed compartment in the officers' deck house on the boat deck. In the same enclosure there is a 120-volt storage battery which is primarily for radio supply, but is of sufficient capacity to also supply the emergency lights for at least ½ hour. Storage batteries are also provided for the electrical interior communication systems and separate batteries for the fire alarms. A motor generator set is provided for the gyroscopic compass system.

## Activities Centralized at Philadelphia Plant

The entire materials handling equipment department of the Yale & Towne Mfg. Co. is now concentrated at the new Philadelphia plant. In this plant are manufactured three different types of materials handling equipment viz., hand and electric chain hoists, overhead conveying systems, and electrical industrial trucks, two types of equipment formerly manufactured at the Stamford, Conn., plant, and the Stuebing line of hand lift trucks formerly made at Cincinnati, and Holyoke, Mass., plants.

The plant extends over an area of approximately four acres and comprises 22 individual buildings. In one of the buildings in this plant are the powerful hoist testing machines capable of testing complete chain hoists of from 1¼-ton to 40 tons capacity. The new plant is a model of efficiency and convenience. The procedure involved, for instance, in the manufacture of load and hand chain such as cutting off, forming, welding, gaging, heat treating, tumbling and final inspection, all being concentrated on one floor whereas at Stamford these various processes of chain manufacture occupied parts of six floors.

The general offices are situated in a separate brick building of modern construction. The offices of James C. Morgan, general sales manager, and William R. Hoyt, works manager, are located in this building as are the offices of the various department managers. The office of the chief engineer and his staff where all of the designing for the three widely different types of equipment is carried on, is located in one of the main factory buildings.

An interesting feature is the spacious display room in which working specimens of all types of Yale materials handling equipment are on display. The plant has excellent railroad and shipping facilities.

## Book Gives Valuable Data

The engineering department of the Dravo Contracting Co., subsidiary of the Dravo Corp., Pittsburgh, has just issued an interesting book entitled *Engineering Works*. The purpose of the book is to show in a comprehensive way the progress made by that department in the development of designs and the construction of all classes of floating and terminal equipment, and dock and material handling installations. It is issued in technical text-book form rather than catalog form, is well illustrated, and portrays the broad experience of the Dravo Contracting Co. and its record of performance which places it today in a leading position among crane manufacturers and shipbuilders.

# Marine Review

Reg.  
U.S.  
Pat.  
Off.

*The National Publication Covering the Business of  
Transportation by Water*

**January, 1932**

*Talamanca . . Segovia . . Antigua . . Quirigua . . Chiriqui . . Veragua*

## **Modern Steam . . . and the Six New Ships of the Great White Fleet**

**M**ODERN Steam at 350 pounds pressure and 666 degrees fahrenheit total temperature guarantees dependable, efficient, and economical operation for the six new sister ships of the United Fruit Company.

These swift and luxurious additions to the Great White Fleet contain the most modern propulsion equipment including Babcock & Wilcox Water Tube Boilers, Superheaters, Feed Water Regulators and furnaces lined with B. & W. No. 80 Firebrick.

That the present economy of steam at higher pressures and temperatures is not limited is conclusively proved in a new and understandable publication of The Babcock & Wilcox Company. Every Naval Architect, Owner and Engineer will find this book of real interest and value . . . simply ask for a copy of *Modern Steam*.



### **BABCOCK & WILCOX** *Marine Products*

Water Tube Boilers	Superheaters
Economizers	Air Heaters
Oil Burners	Stokers
Oil Separators	Refractories



THE  
**BABCOCK & WILCOX**  
COMPANY  
85 LIBERTY ST. NEW YORK, N. Y.

M-11

# NEWPORT NEWS

## *Delivers New Liner For The Great White Fleet*

THE delivery of the S. S. TALAMANCA on December 12th, to the UNITED FRUIT COMPANY adds another vessel to that famous "Great White Fleet" which has played a prominent role in the trade relationship of the United States and her Caribbean neighbors.

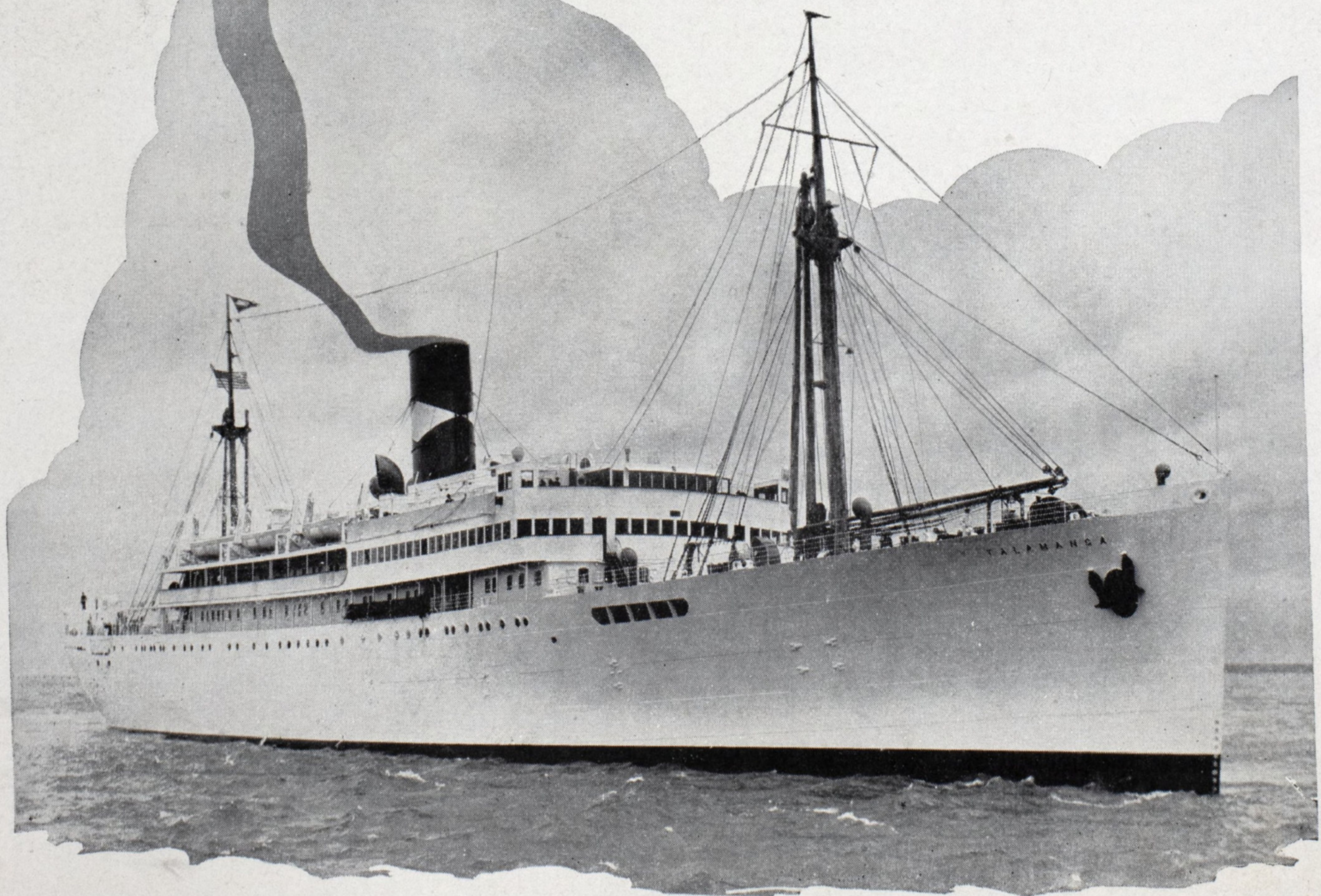
In speed, depth and beam the TALAMANCA exceeds all other ships of the fleet. At normal service draft she will maintain a speed of eighteen knots.

The S. S. TALAMANCA was designed especially for cruising tropical waters—for a company that has a motto, "Every passenger a guest".

Newport News Shipbuilding  
and Dry Dock Company

Newport News, Va.

90 Broad St. New York City



# THE TEST OF TIME



When a product survives the test of time and times, it may be termed a "survival of the fittest". But—when this product constantly improves, steadily grows in popularity and is always recognized as a leader—it must be good.

Columbian *Tape-Marked* Pure Manila Rope has had such a history. It has always been good and this quality has characterized Columbian among users of dependable rope.

Just examine the features of Columbian *Tape-Marked* Rope and the reasons for its leadership will quickly be understood. No other rope contains all these features:—

It is made in the world's most modern cordage mill.

It is guaranteed by the famous red, white and blue *Tape-Marker*.

It is easily identified by this *Marker* and in  $\frac{3}{4}$ " diameter or larger appear the red, white and blue surface markers.

It is the most flexible rope when wet.

It is waterproofed and thoroughly sealed against germs of decay.

It is rot-proof.

It is non-kinking.

It is made from fibre specially selected by Columbian fibre men in the Philippines.

It is a balanced rope.

It possesses extra strength and durability.

When your rope lines need replenishing, you might better obtain the rope containing all these features. To be sure of this, order Columbian *Tape-Marked*.

## COLUMBIAN ROPE COMPANY

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Auburn, "The Cordage City" N. Y.

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# COLUMBIAN TAPE MARKED PURE MANILA ROPE

# PASSENGER LINER\* held for repairs after MAIDEN VOYAGE

★ ★ ★

The right time to start  
correct lubrication is when your  
vessel is launched

A bottle tinkled on the bow of a great passenger liner. Proudly and gracefully she slid down the ways. A few months later, with every cabin filled, she put out of port on her maiden voyage to New York.

Trouble soon developed. Cylinder oil was reaching boilers. When she docked examination showed that boiler furnace crowns were down. Repairs kept her tied up five days past sailing date and on the return voyage the trouble continued. Again she missed her sailing date.

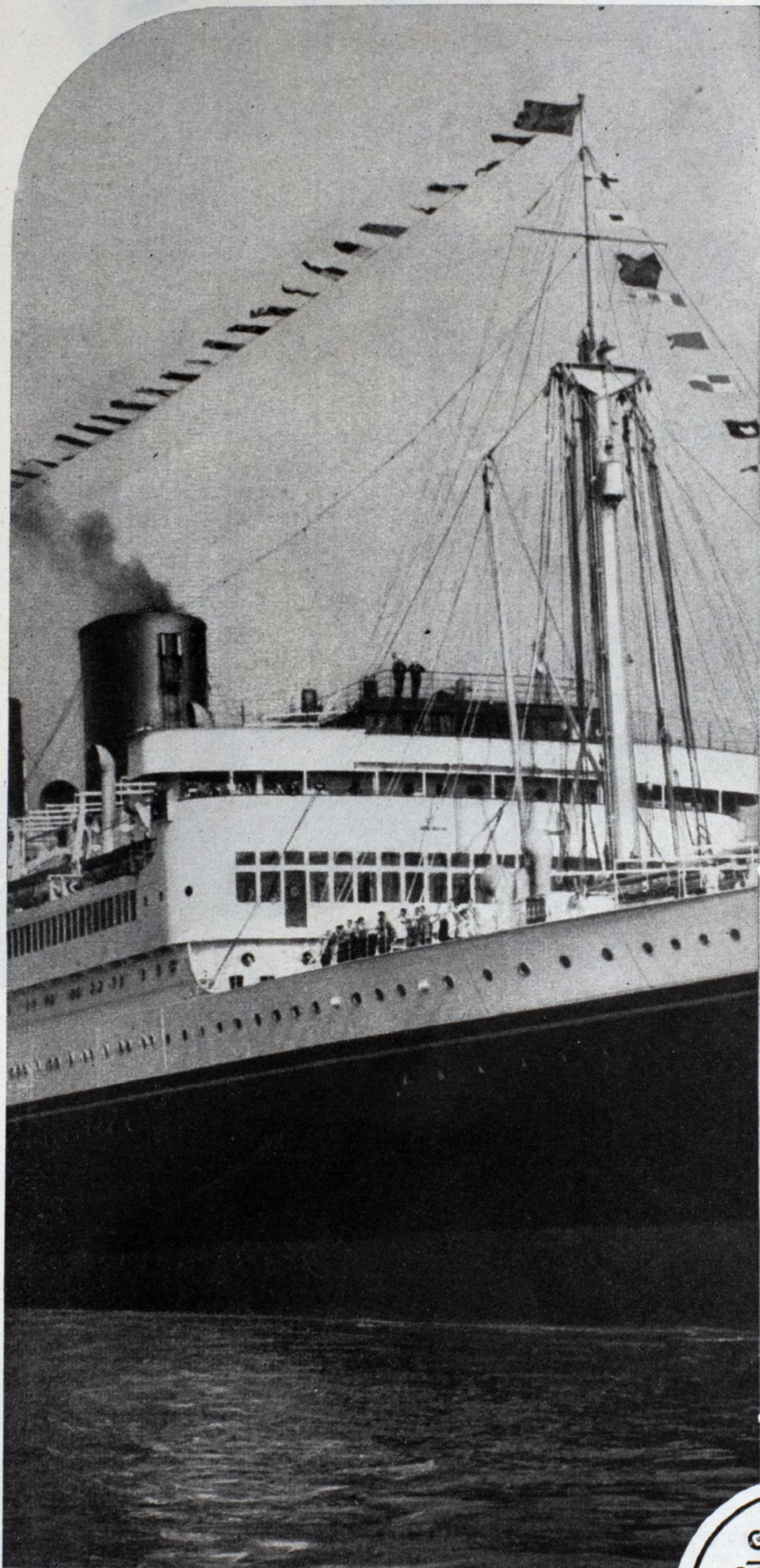
In the meantime the chief engineer had made his diagnosis—*incorrect lubrication*. A Vacuum Oil Company engineer was called in. Recommendations were quickly made and followed. The correct grade of Gargoyle Marine Oils was applied, and as a result, the trouble was permanently eliminated.

But repairs for these two voyages cost between \$10,000 and \$15,000. It's impossible to calculate how much the line lost in good-will.

To forestall just such trouble and expense, a large portion of the world's tonnage uses Gargoyle Marine Oils. Actual performance records constantly prove these lubricants save power, reduce fuel and oil consumption, lower repair bills and increase engine life.

The Vacuum engineer in any leading port will more than likely be able to reduce your engine-room costs.

In the meantime, we will be glad to furnish you either of these helpful books, without obligation—"Steamships with Reciprocating Engines," or "Marine Lubrication—Motorships." Just address Vacuum Oil Company, Inc., Marine Sales Dept. D-1, 61 Broadway, New York, U. S. A.

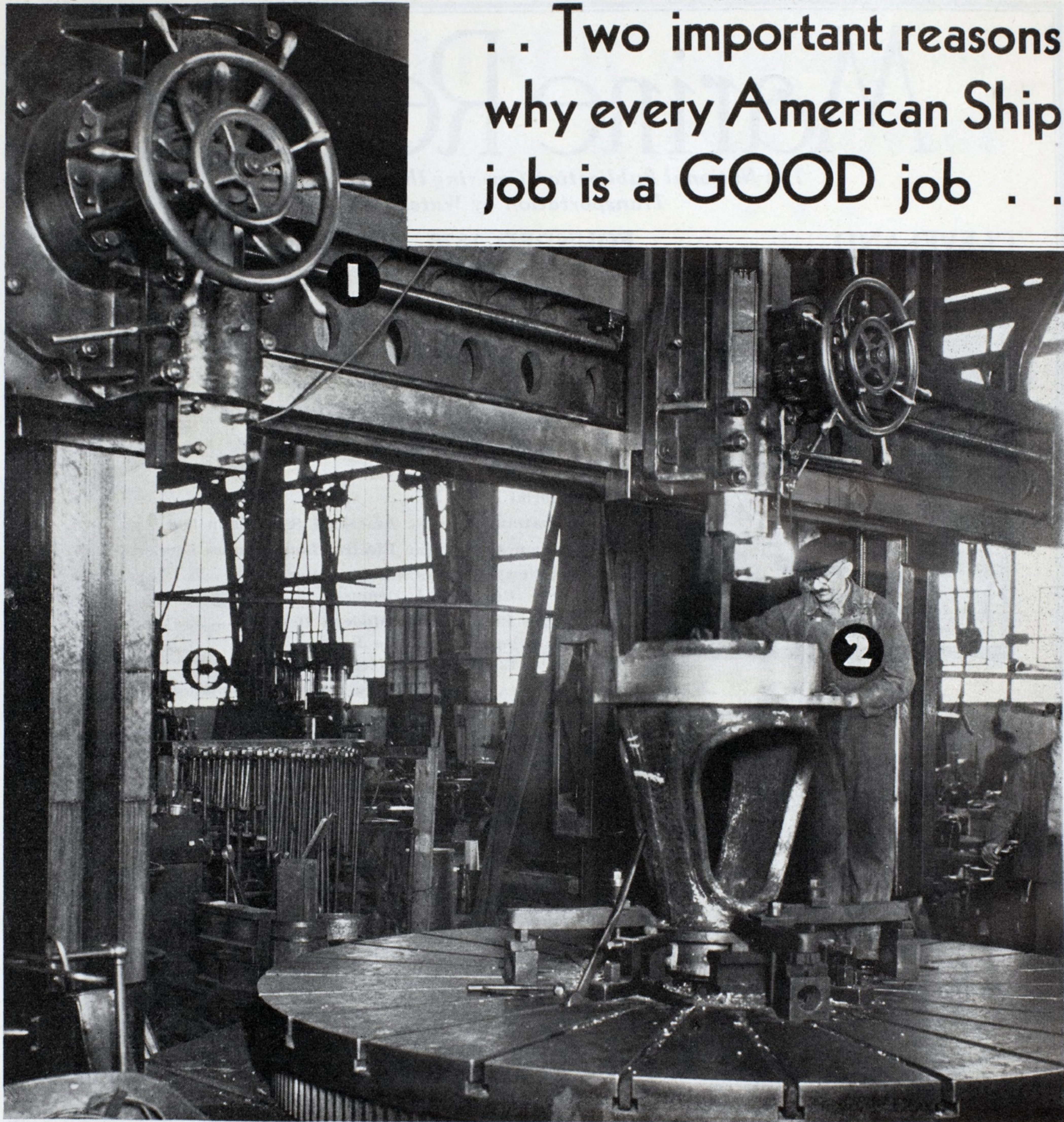


\*Vessel driven by twin, triple-expansion reciprocating engines exhausting into low-pressure turbines.



## VACUUM OIL COMPANY, INC.

... Two important reasons  
why every American Ship  
job is a **GOOD** job ...



**1** Each of American Ship's conveniently located shipyards is equipped with complete, modern facilities for building, altering and repairing ships.

**2** Each of American Ship's yards is staffed by men who know only one way to do a job: The best way—the only way it should be done when lives and loads may depend upon it.

The result is inevitable. Every American Ship

job is a *good* job and completely dependable—and it is done swiftly and efficiently at right prices.

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Main Office: Foot of West 54th Street, Cleveland, Ohio

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## This is EFCA Service

The Export Fibreboard Case Association\* has nothing whatever to sell. Its sole mission is one of SERVICE. And THIS is what it does . . .

1. Aids in the education of freight handlers. Constructive aid—that results in better handling of goods and lowered damage and liability claims.
2. Intensive and convenient service by experienced traffic representatives. In many leading ports of the world Efca representatives service import and export shipments and give valuable suggestions on physical handling.
3. The establishment and trademarking of a Standard of Merit for approved export fibreboard shipping cases. Approvals are based upon no less than twelve months of actual testing in export operations. They are now established on fibre-board cases used for exporting Canned Goods, bulk and cartoned Raisins.
4. The collecting, disseminating and publishing of information which will benefit the shipping industry. The second booklet in a series of suggestions for the proper handling of export fibreboard shipping cases is now being distributed. Copies may be had on request.

*Specify Efca Cases*



\*An International Association of Leading Fibreboard Case Manufacturers.

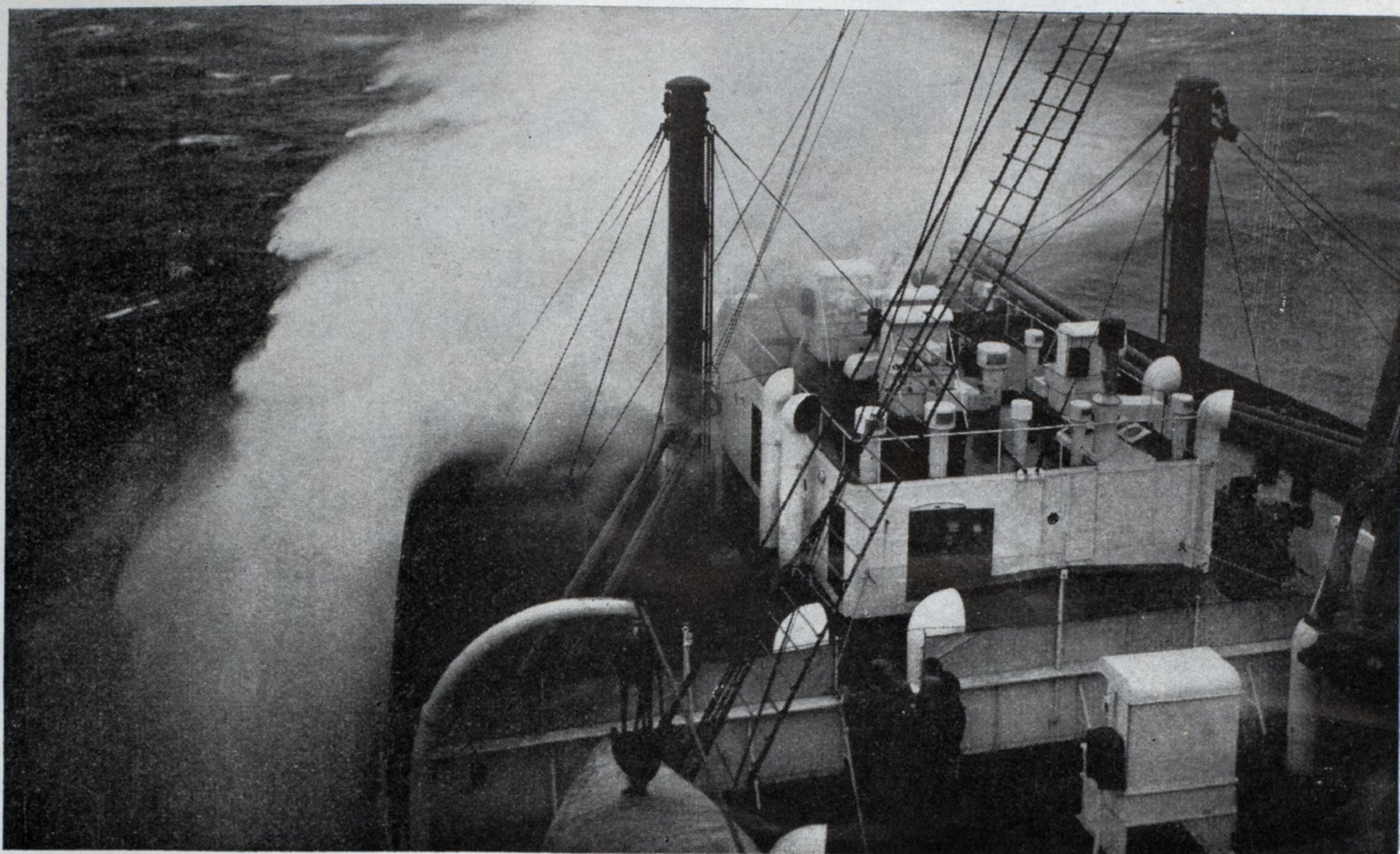
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London — New York — San Francisco — Sydney

### MEMBERS' MILLS AND FACTORIES:

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# LOOKING AHEAD...



**I**T IS true for the moment that international trade is suffering from the disorganization of great areas of peoples whose consuming power has been severely injured. THIS CONDITION IS TEMPORARY.

All over the world there is restlessness that may in its economic aspect be traced to the fact that many races are desirous of becoming greater consumers of the wealth and delights of higher and more comfortable civilizations. All the eagerness for new adjustments will organize itself with a rapidity greater than it is easy to realize now and there will be as a natural and inevitable result a sea trade requiring transportation for which THE BUSINESS ENTERPRISE OF THIS COUNTRY SHOULD BE ADEQUATELY PREPARED IN MERCHANT MARINE DEVELOPMENT—BUT—

**Unless American-Flag vessels have the support and patronage of American travelers and shippers, this expansion of the American Merchant Marine can never take place.**

## NEW YORK SHIPBUILDING COMPANY

Main Office and Yard:  
Camden, N. J.

New York Office:  
420 Lexington Avenue



# **THE LARGEST, FASTEST AND MOST MODERN FLOATING DRY DOCK ON THE AMERICAN CON- TINENT IS AVAILABLE AT A "UNITED" PLANT**

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**LIFTS ORDINARY MER-  
CHANT SHIPS IN SIX-  
TEEN MINUTES . . . THE  
LARGEST VESSELS IN  
TWENTY-FIVE MINUTES  
ACTUAL PUMPING TIME.**

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**MORSE PLANT  
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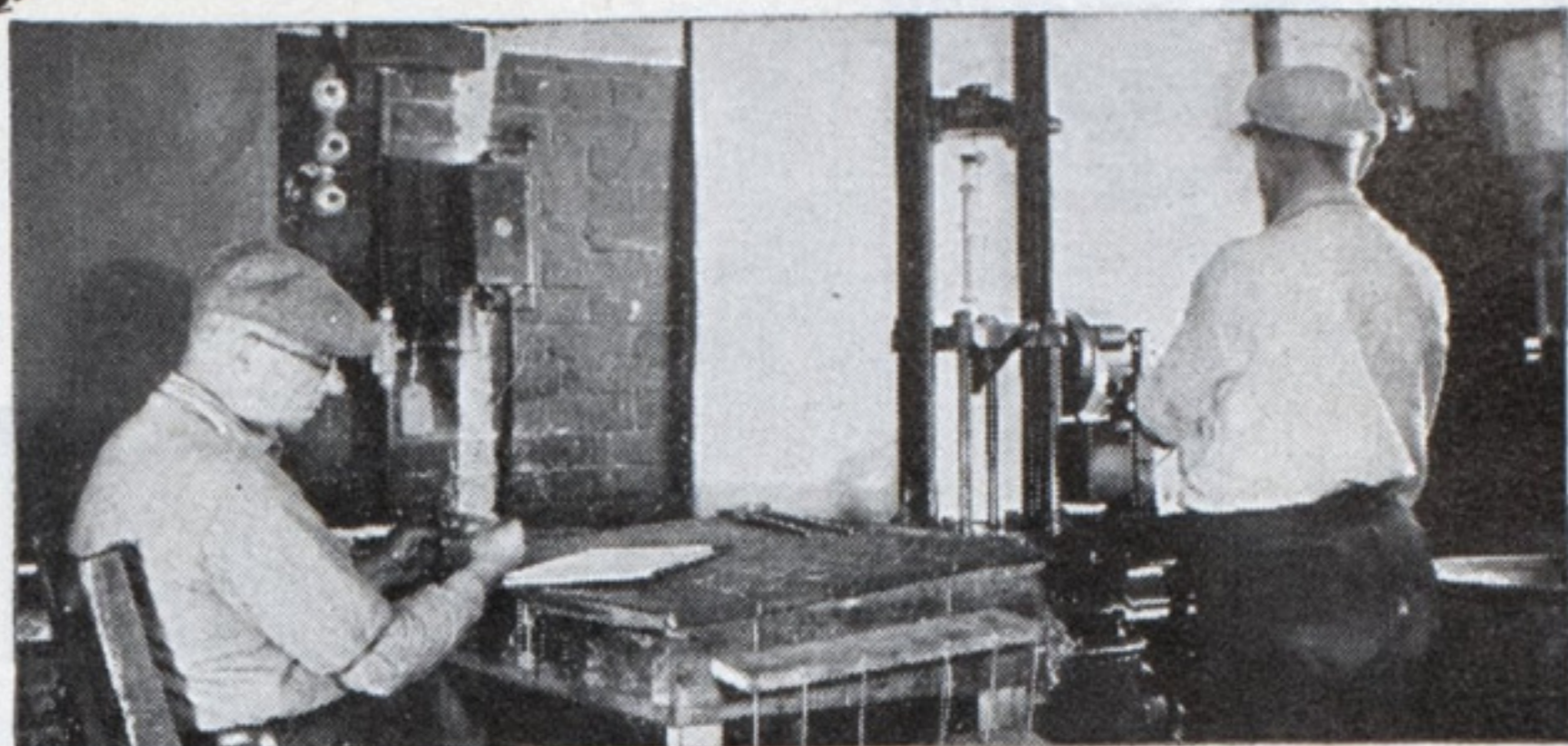
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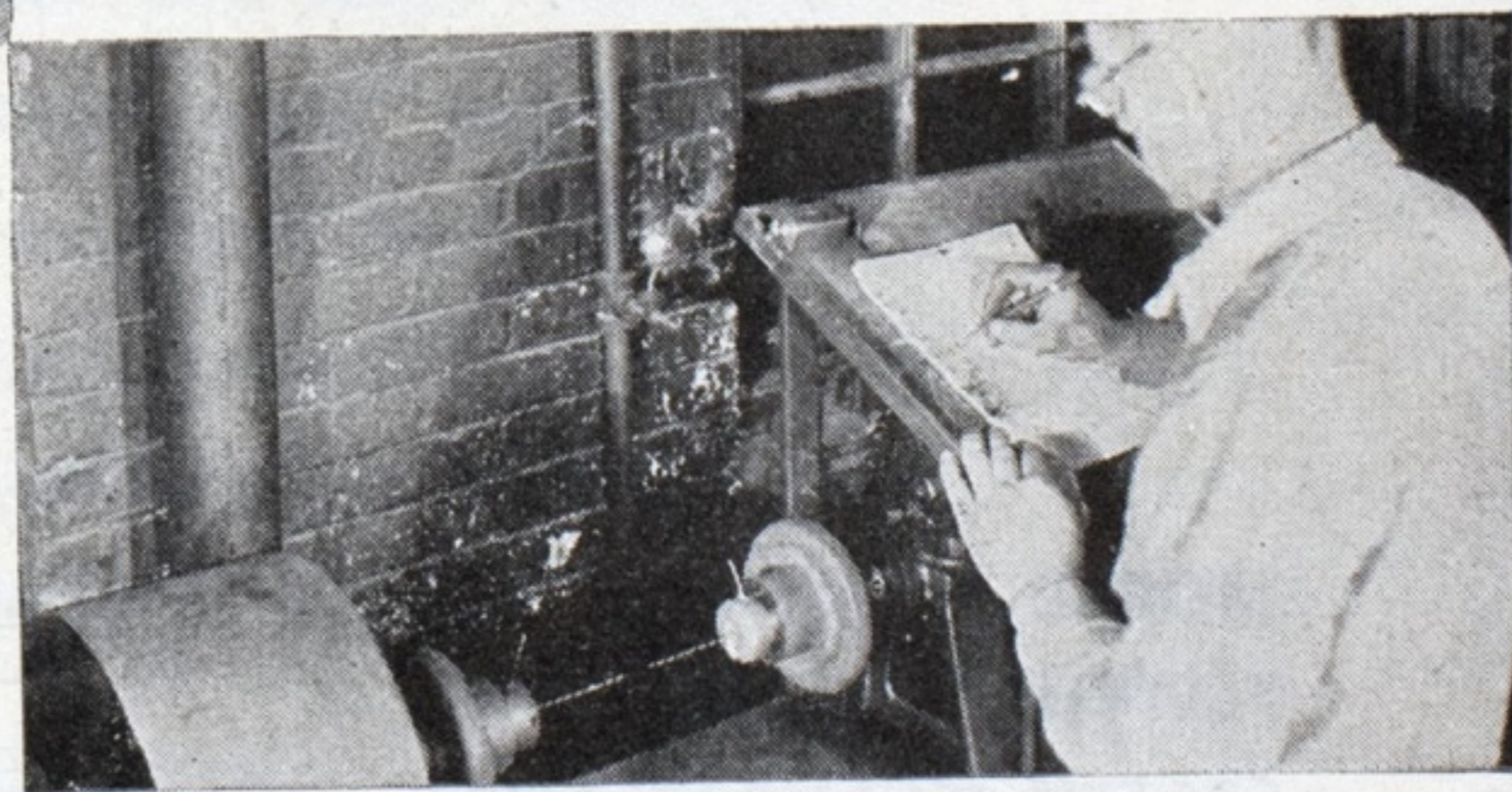
**INCORPORATED**

**Cable Address: UNIDOCK  
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# Testing *your wire rope*



YOUR wire rope?... Yes, for every bundle of wire that will later become a part of Wickwire Spencer Wire Rope is sampled twice. Each sample is tested independently for tensile strength, elongation and torsion. These tests are in addition to our chemical, physical and microphotographic tests that all Wickwire Spencer Wire undergoes in course of manufacture. The meticulous care with which this rope is made is reflected in the excellence of the product.



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Pacific Coast Headquarters: San Francisco  
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# WICKWIRE SPENCER

Send for our book. It is free and  
will prove of great value in selecting

## Wire Rope

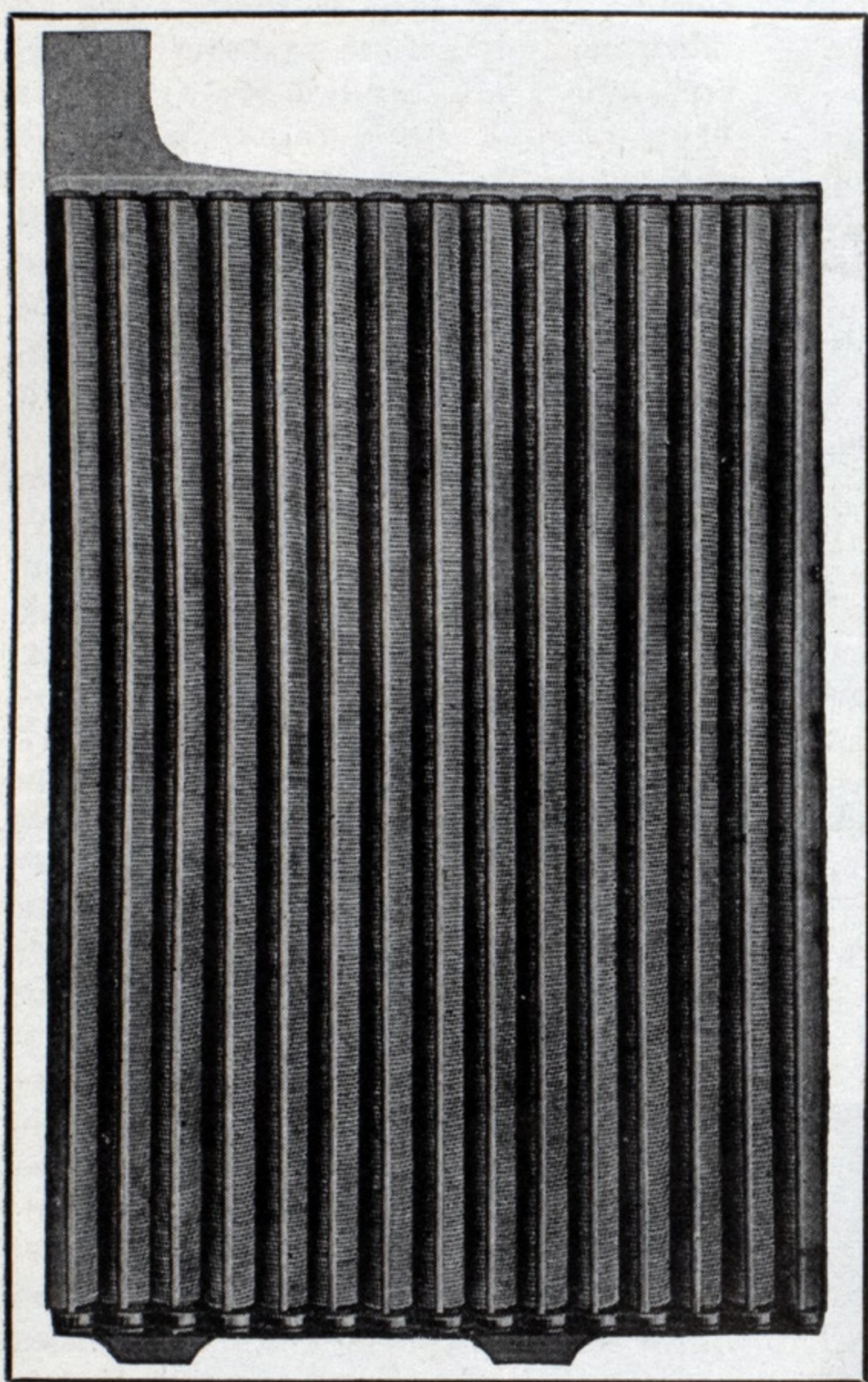


# GREATER

*Life, Power,  
Economy . . .*

*with*

# Exide-Ironclads . .



Here is a positive plate of an Exide-Ironclad Battery. Each of those vertical rib-like structures are tubes of slotted rubber within which is contained the active material. Thus imprisoned, the active material cannot readily escape, but *remains* in the plate, thereby prolonging its useful life.

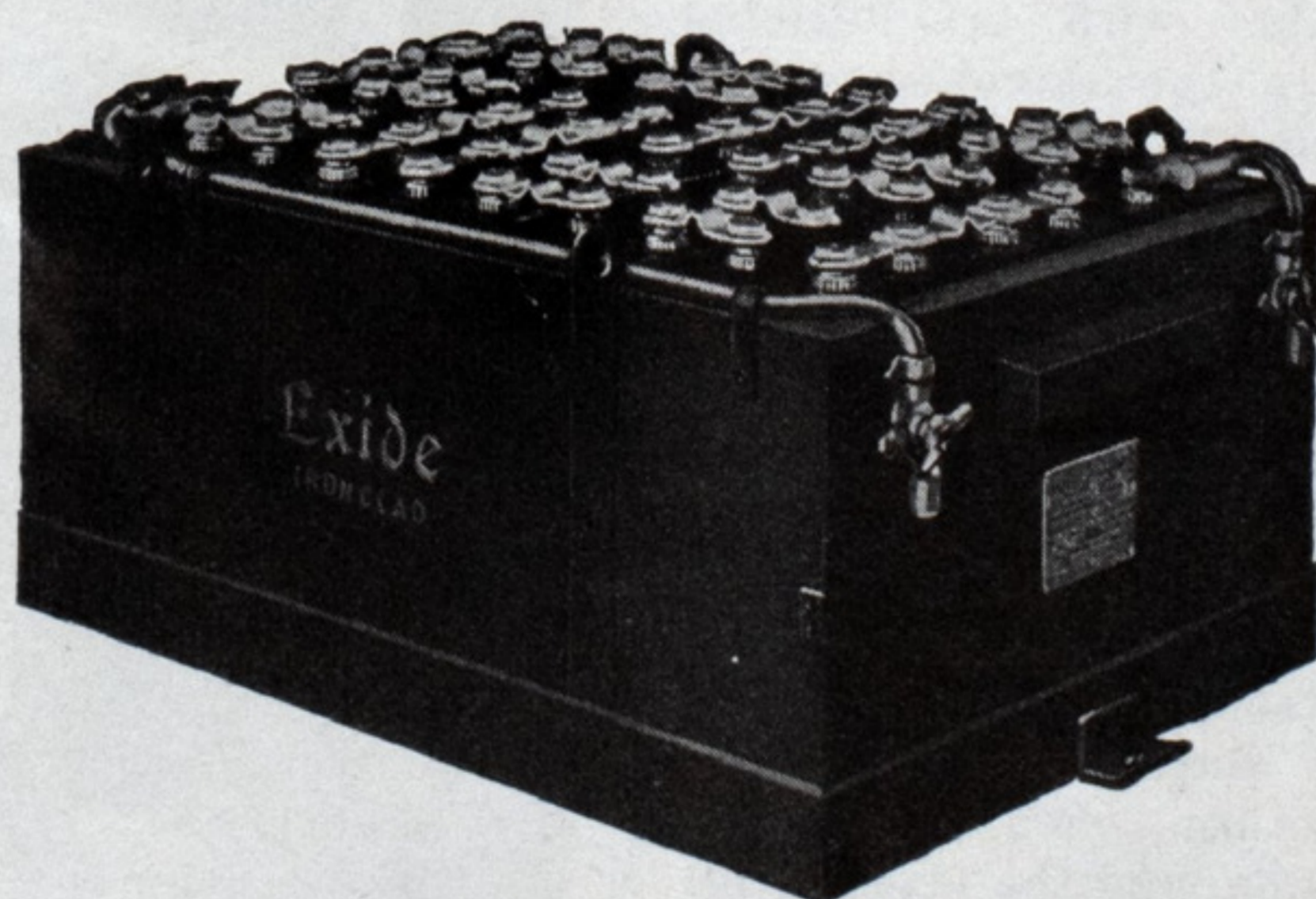
●  
**B**ECAUSE they are unlike any other battery, Exide-Ironclads give unusual satisfaction.

Their positive plates, for instance, are altogether different from those of other batteries. Imprisoned within tubes of finely slotted rubber, the active material is held securely in place—its loss so retarded as to greatly increase its life.

Then, too, Exide-Ironclads have a high electrical efficiency, making them economical to charge.

They have tremendous power and impart a good speed to truck, tractor or locomotive, all day long.

Prove the superiority of the Exide-Ironclad; install one in one of your own trucks and learn why those who use them are so well satisfied.



A Typical Exide-Ironclad Battery for Industrial Truck Service

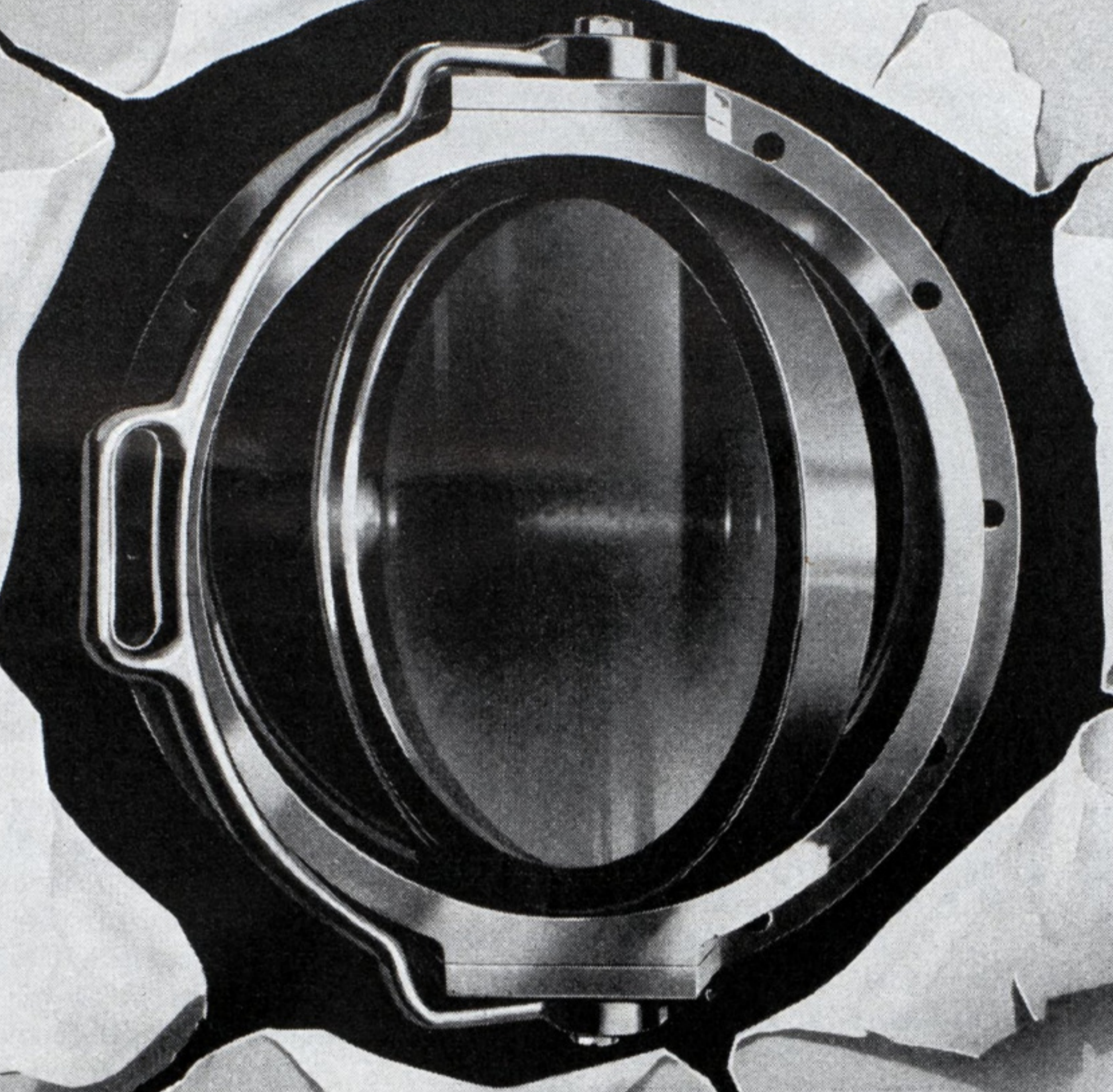
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THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia  
THE WORLD'S LARGEST MANUFACTURERS OF STORAGE BATTERIES FOR EVERY PURPOSE

*Exide Batteries of Canada, Limited, Toronto*

MARINE REVIEW—January, 1932

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THE LIGHT YOU'VE BEEN  
WAITING FOR . . . .

FOUR NEW PANAMA MAIL LINERS  
WILL HAVE IT . . . . .

UP-TO-THE-MINUTE SHIPS EQUIPPED  
WITH UP-TO-MINUTE LIGHTS . . .



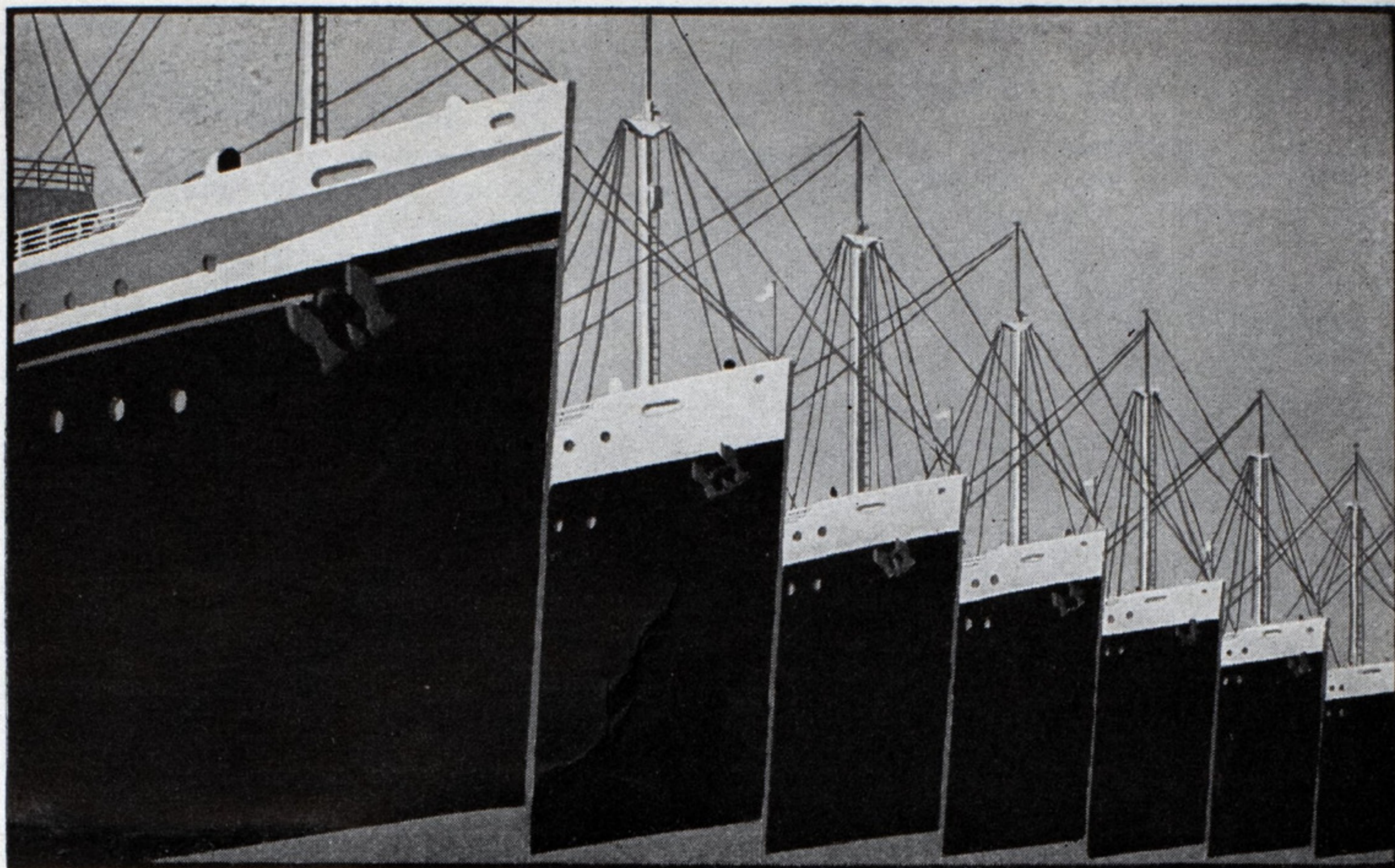
### AMERICAN LOCOMOTIVE CO.

30 Church Street, New York, N. Y.

Rialto Building

San Francisco, Cal.

1931



# MADE HISTORY IN MARINE ELECTRIFICATION

BECAUSE the combined horsepower of turbine-electric equipment installed and now in process of construction passed the one million mark during this year. BECAUSE the Dollar Liner, *President Hoover*, first all-electric ship built in America for commercial transoceanic service, completed its first round trip to Asiatic ports. BECAUSE the *Talamanca*, the first ship of the largest electrically propelled fleet ever laid down, was delivered to its owner, the United Mail Steamship Company. BECAUSE electrification—an American contribution to marine transportation—was adopted by the leading shipbuilding countries of the world. BECAUSE, on the high seas and on inland waterways, electrically propelled ships established new records for speed and continuous operation. • General Electric propulsion

equipment was chosen for the *President Hoover*, for the six ships of the United Mail Steamship Company's fleet, and for vessels in many other classes of service.

GENERAL  ELECTRIC

173-24

MARINE  
EQUIPMENT

JOIN THE "G-E CIRCLE"—SUNDAYS AT 5:30 P.M.  
E.S.T. ON N.B.C. NETWORK OF 54 STATIONS—  
WEEK-DAYS (EXCEPT SATURDAY) AT NOON

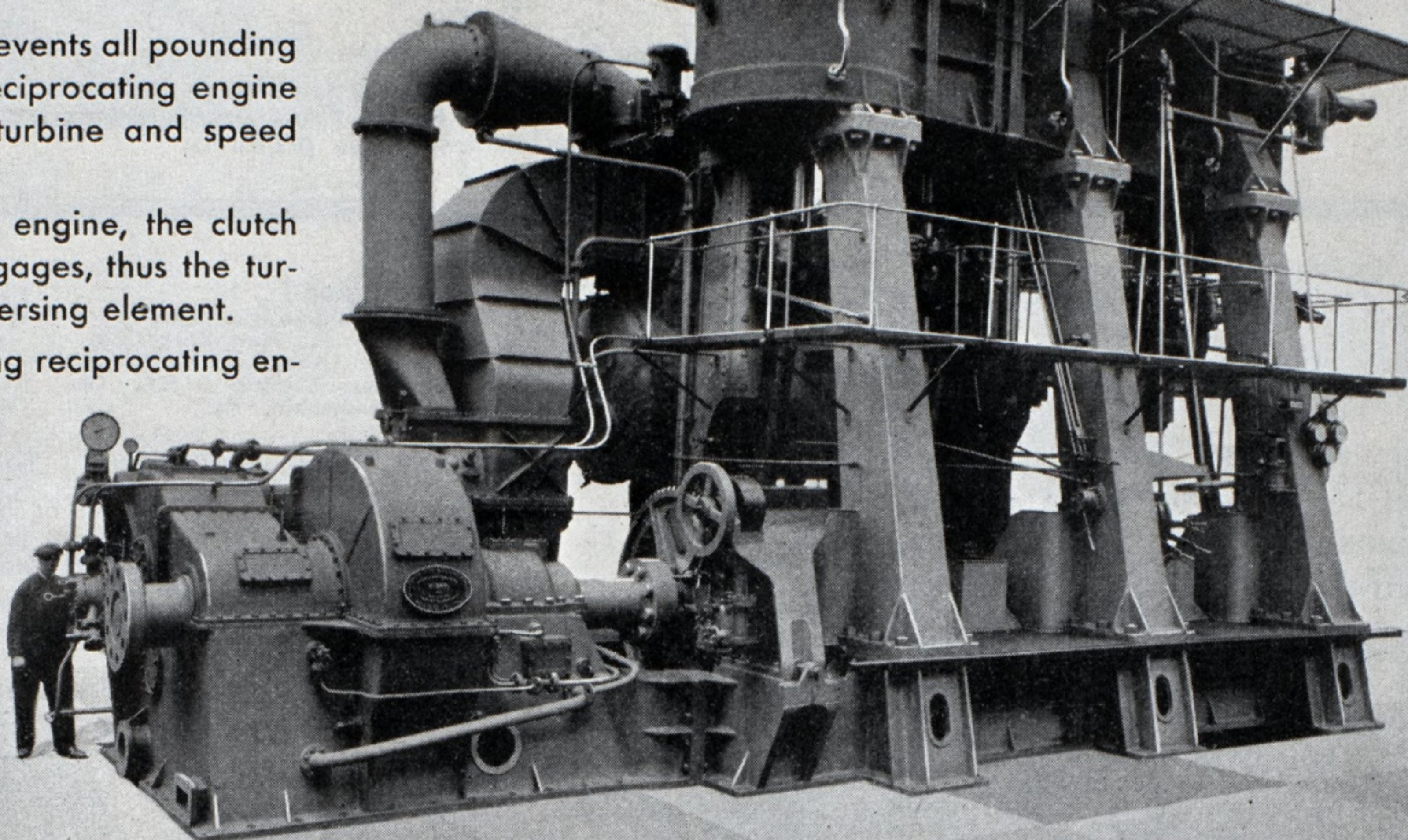
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## In the **DE LAVAL BAUER-WACH EXHAUST TURBINE SYSTEM**

a hydraulic clutch prevents all pounding or jar due to the reciprocating engine from reaching the turbine and speed reducing gears.

Upon reversing the engine, the clutch automatically disengages, thus the turbine requires no reversing element.

As applied to existing reciprocating engine plants, 20 per cent less fuel is required for the same speed, or 25 per cent more power is obtained from the same boiler plant and fuel consumption.



**DE LAVAL STEAM TURBINE CO., TRENTON, N. J.**

Turbine and Motor Driven Auxiliaries, including Bilge and Cargo Pumps, Circulating Pumps, Boiler Feed Pumps, and Centrifugal Oil Purifiers. Sole Licensees of the Bauer Wach Exhaust Turbine System.

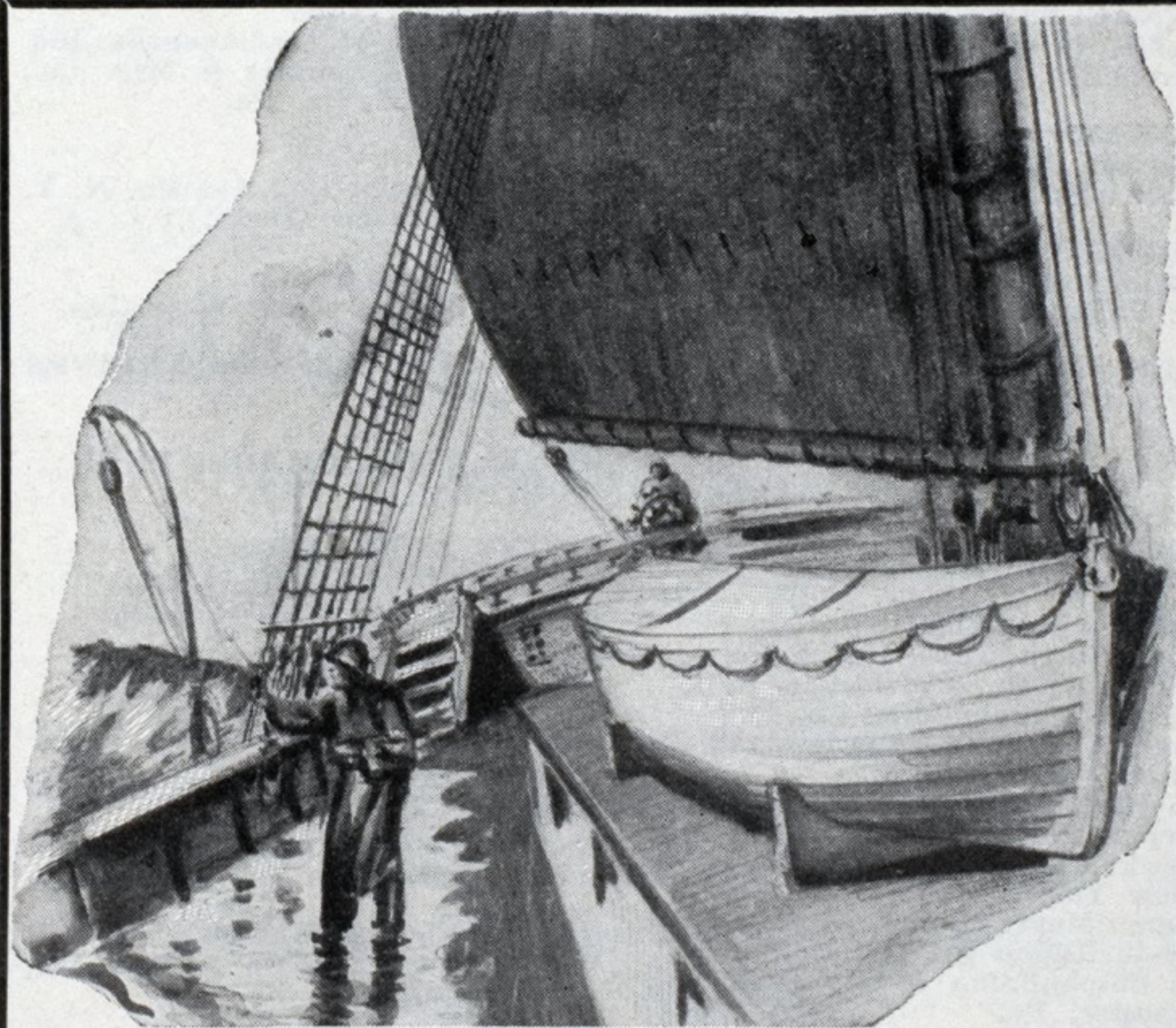
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*Be sure to include Marine Review in your sales and advertising plans to reach the really important men who say yes, and O. K. requisitions in the marine trade.*



*"Then Ho for the swash of the briny wash"*

In heavy weather, a tight deck is just as important as tight seams. Poor deck caulking means ruined cargoes, wet sleeping quarters, food spoilage and many annoyances.

Caulk your deck with

## STRATFORD OAKUM

Make it as tight as your garboard.

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*Be sure to use Stratford Oakum.*

**George Stratford Oakum Company**

Jersey City, New Jersey

*Also Manufacturers of Cotton Wiping Waste*

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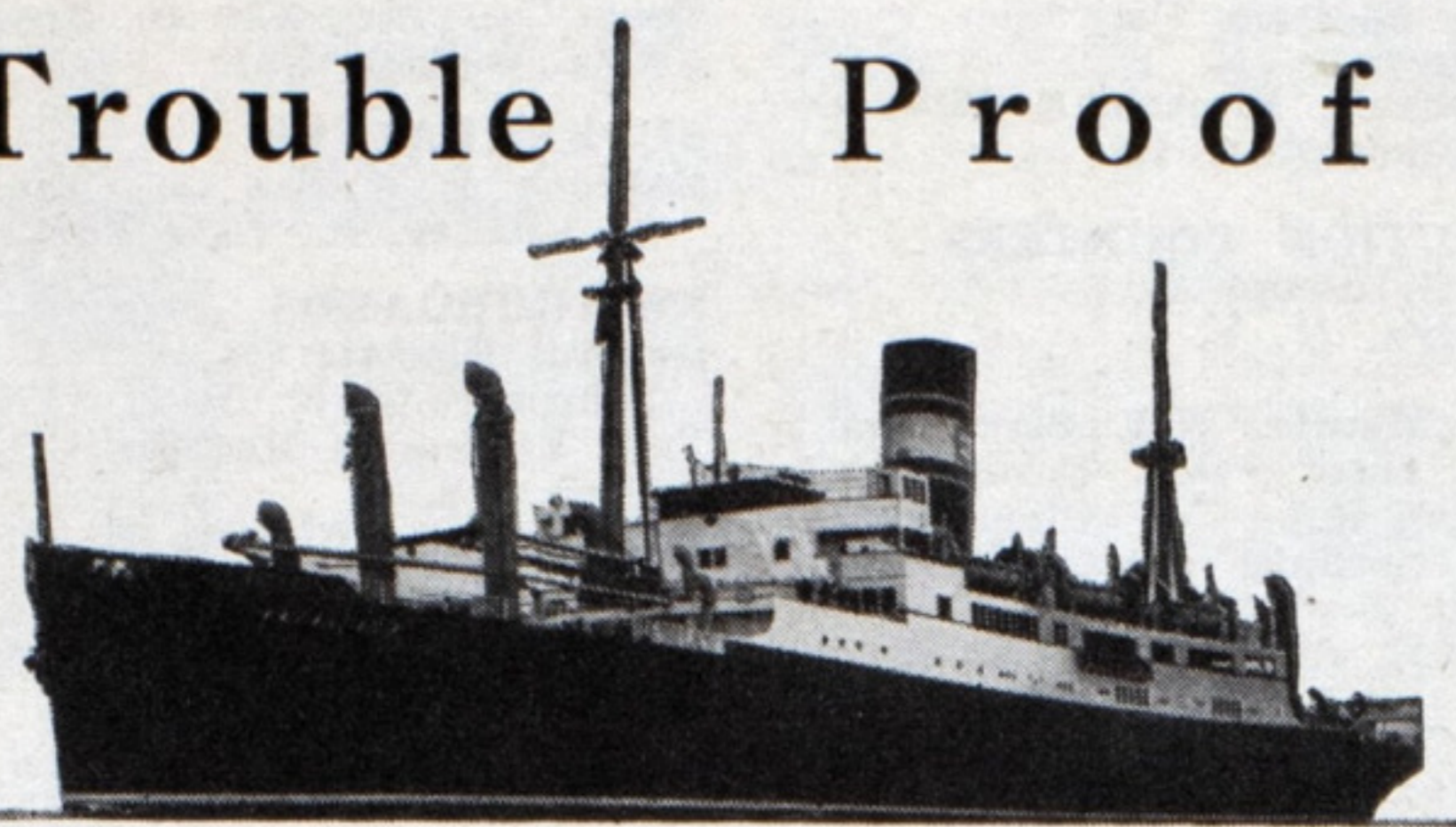
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## Trouble Proof



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SELBALITH varied color tile and plain colored SELBALITH are fireproof, watertight, vermin-proof and corrosion proof.

Approved by American Bureau of Shipping. Write for information on our 8 types of flooring to meet modern needs on ships of all classes.

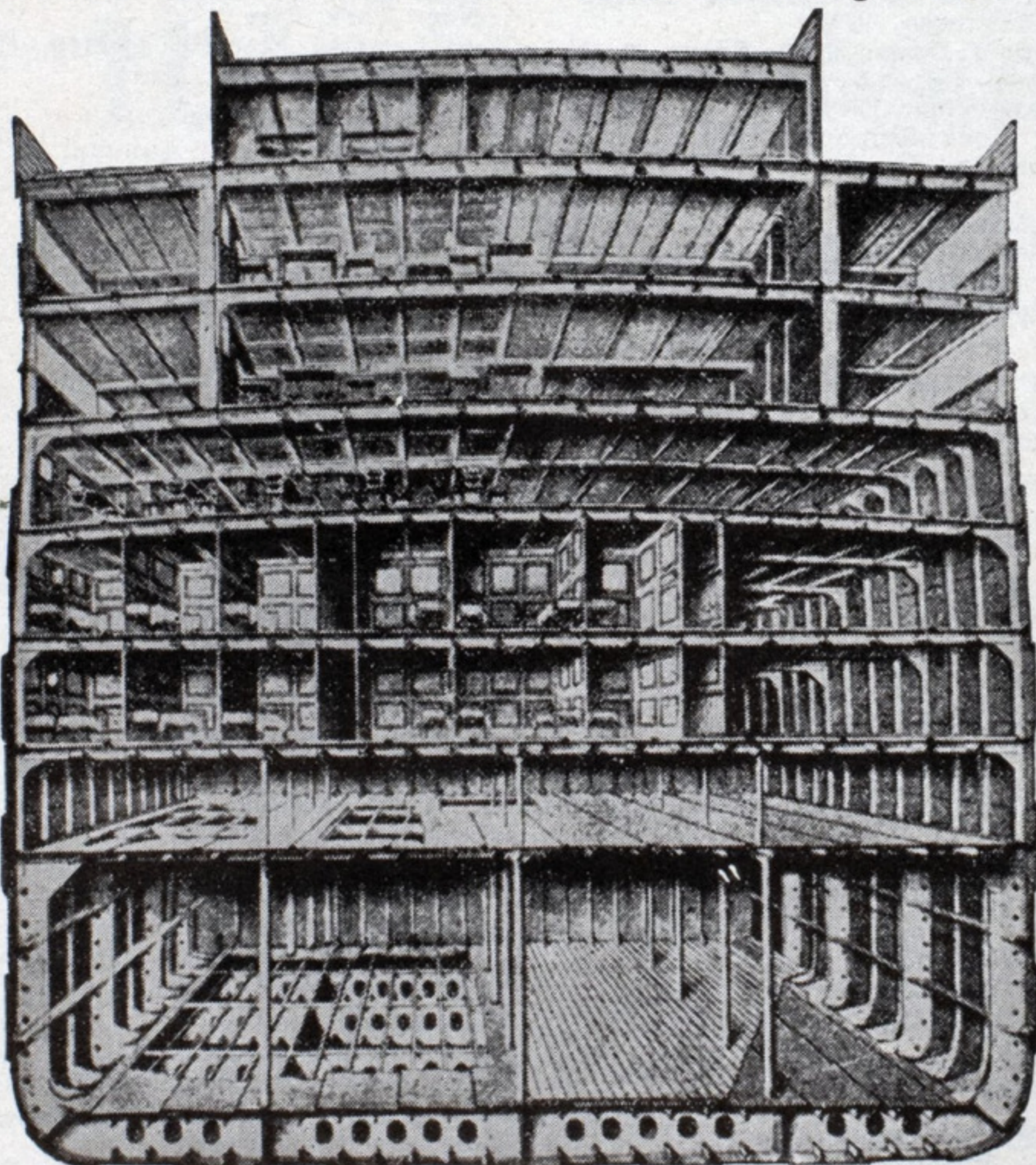
**SELBY, BATTERSBY & CO., Inc.**

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Philadelphia



135 Liberty St.  
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## Isherwood Combination System



Sectional View of Interior of Passenger Liner designed on the Isherwood Combination System

(In a vessel of this type, deep transverse are recommended for hold construction, but are not essential.)  
Adaptable to any type but particularly advantageous for passenger liners.

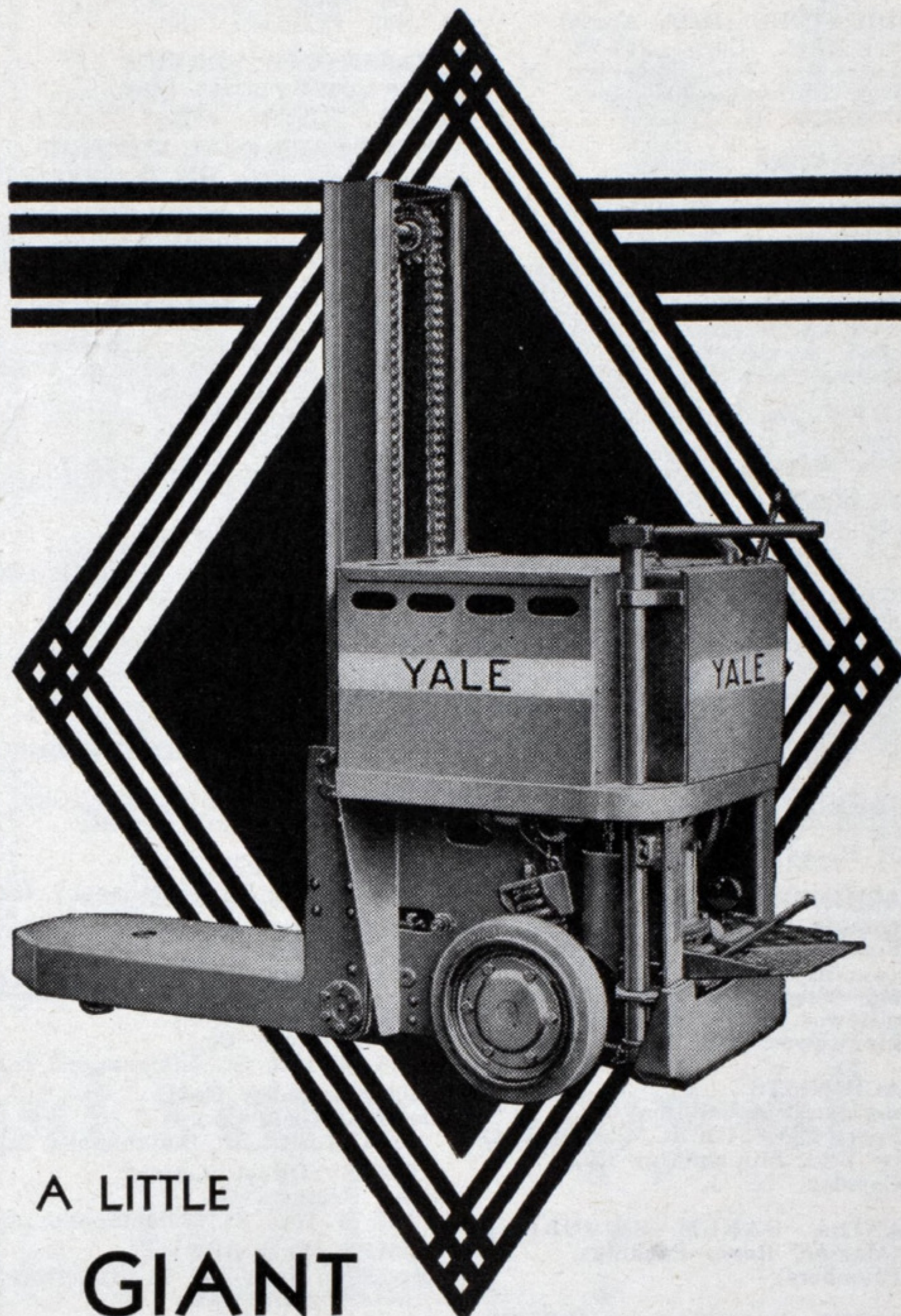
Shipowners are advised to specify that plans and structural arrangements should be approved by

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2

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A LITTLE  
**GIANT**

*in Strength and a  
GLUTTON for WORK*

A compact, powerful truck with high cruising speed—for use with low skids, on crowded floors, through narrow aisles, lifting, hauling, stacking.

Write for detailed information regarding the Midget Electric Truck or any other type of Yale Electric Industrial Truck. Address Dept. G-1.

**THE YALE & TOWNE MFG. CO.**  
**PHILADELPHIA DIVISION**  
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Makers of Yale Electric Trucks, Hand Lift Trucks, Hand Chain Hoists, Electric Hoists and Trolleys





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Used on all types of boilers by all the Principal Navies of the world

**"The Water Shows Black"**

**ADVANTAGES:** Quick and reliable observation of the water level. Safe, sure and durable at high pressure. Not affected by cold air drafts. Most effective protection against injuries to boilers and workmen. Easily applied to all types of gage glass fittings.

When filled with WATER the Reflex Gage always appears **BLACK**. When empty it instantly shows **WHITE**. No mistake possible. This feature alone is worth many times the cost of the Reflex.

Send for catalog of Water Gage Apparatus

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**JERGUSON  
GAGE & VALVE CO.**

WINTER HILL, SOMERVILLE, MASS.

**LURLINE  
MARIPOSA  
MONTEREY**

*On Outstanding  
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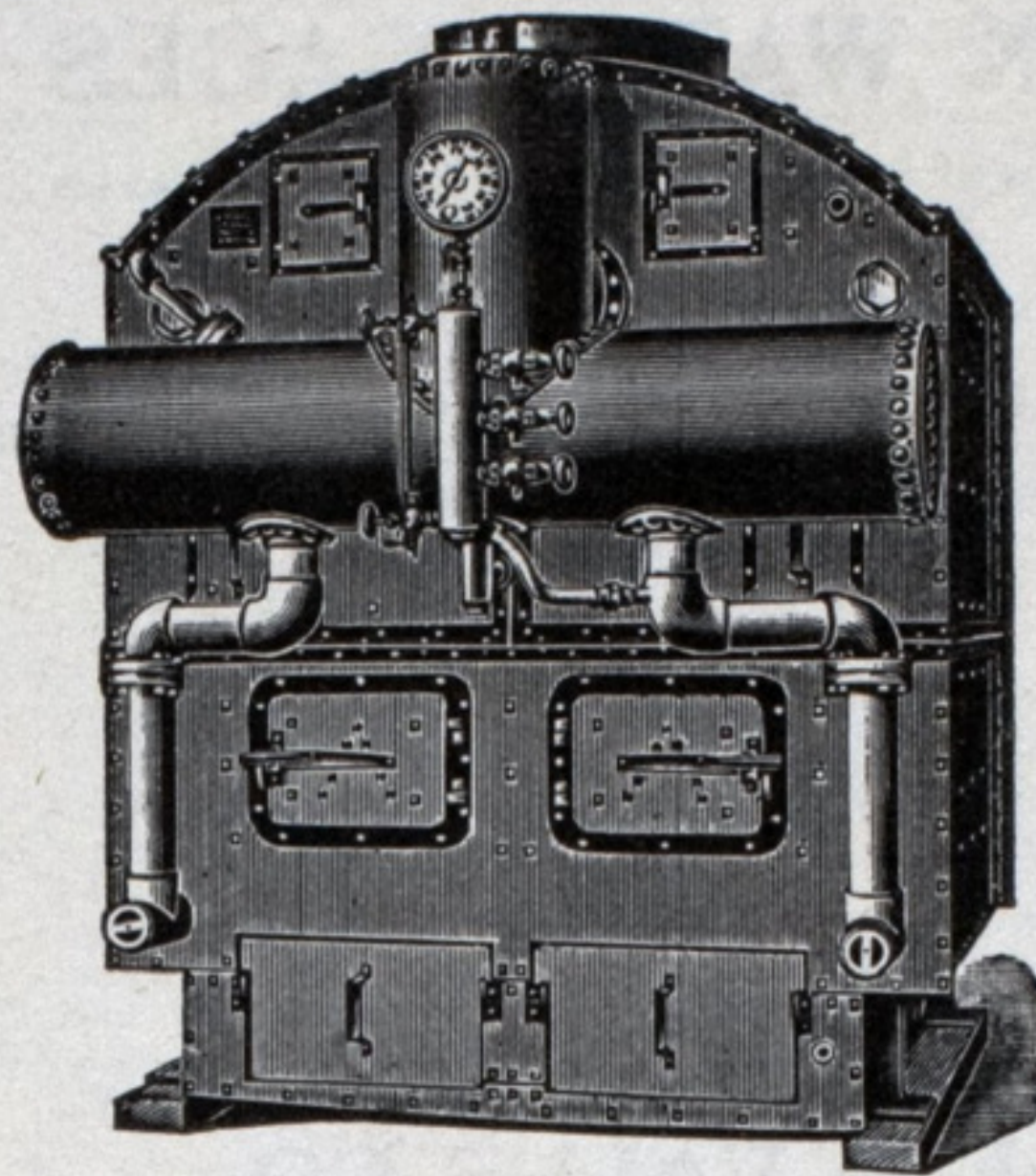
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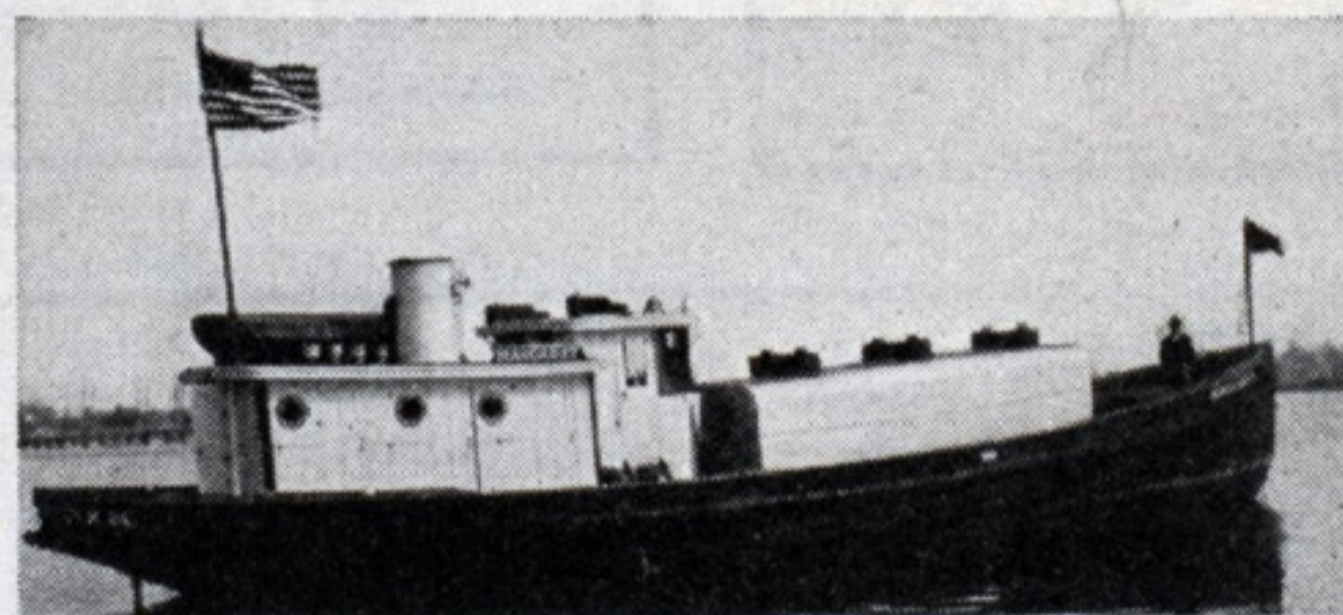
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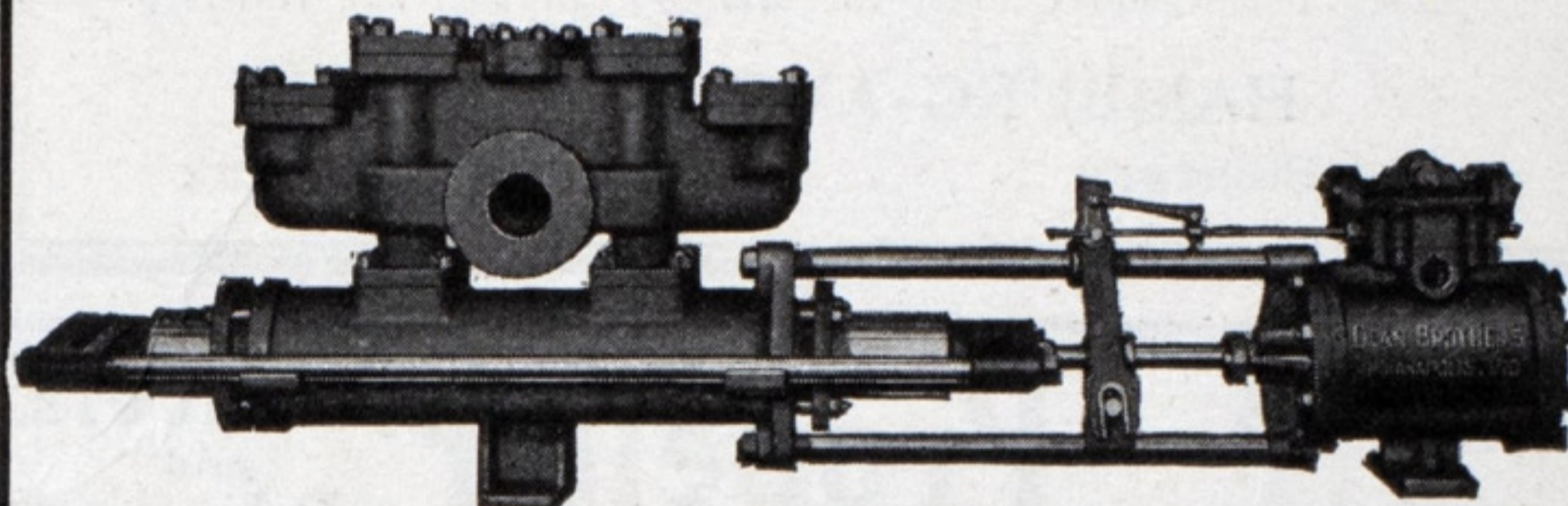


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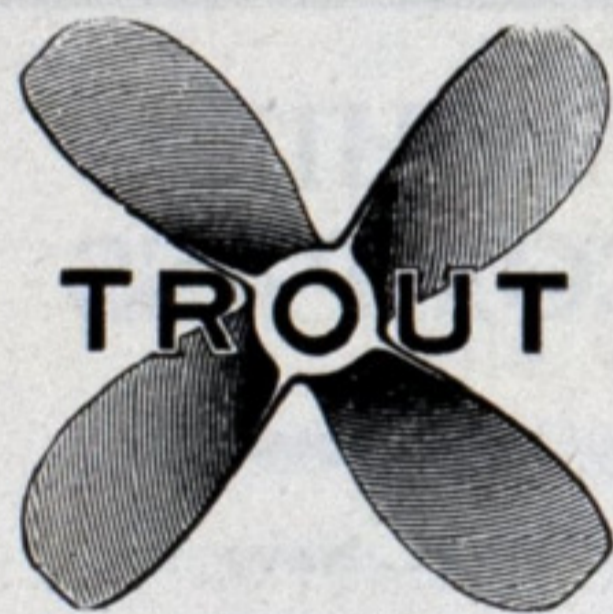


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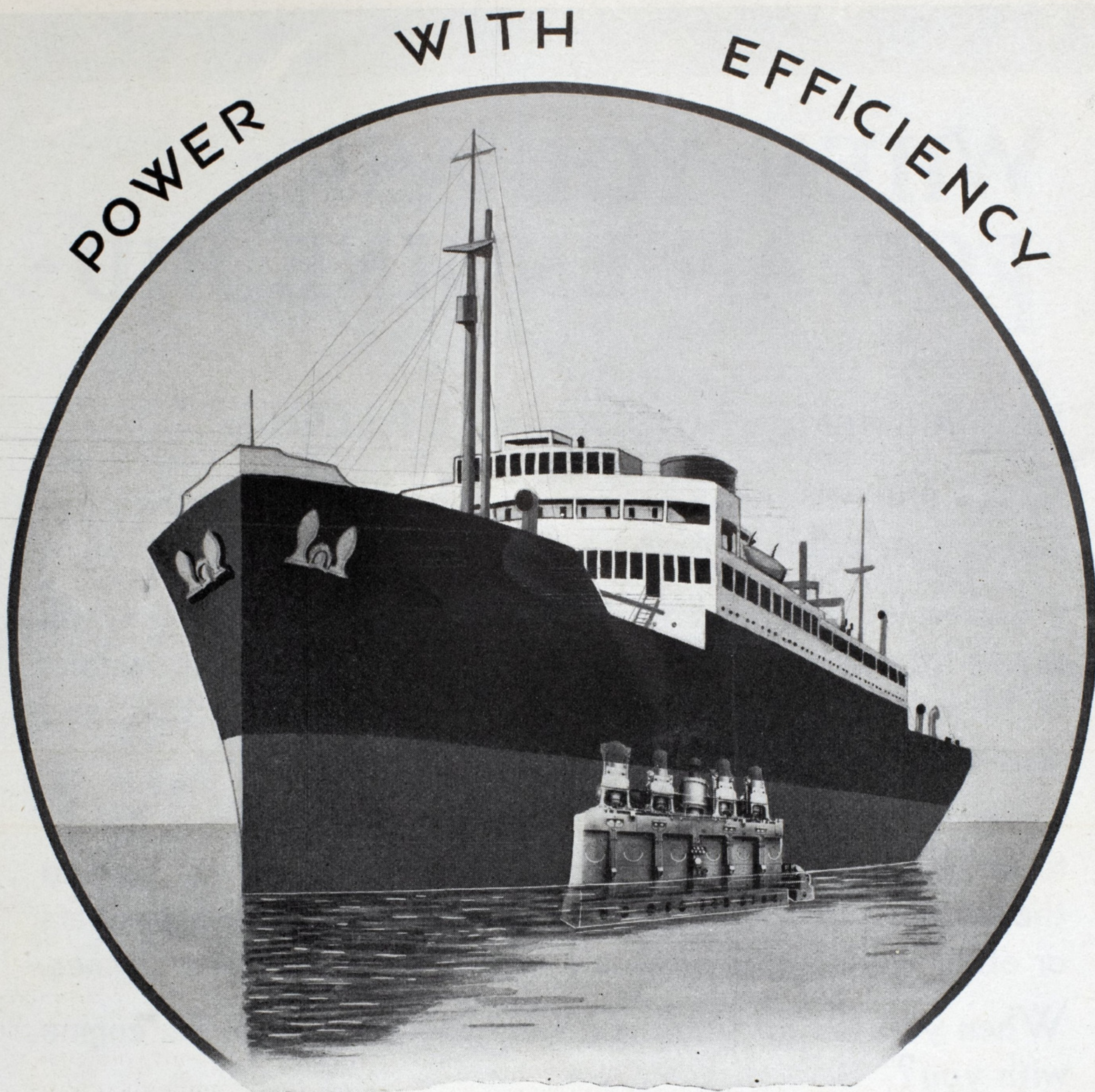
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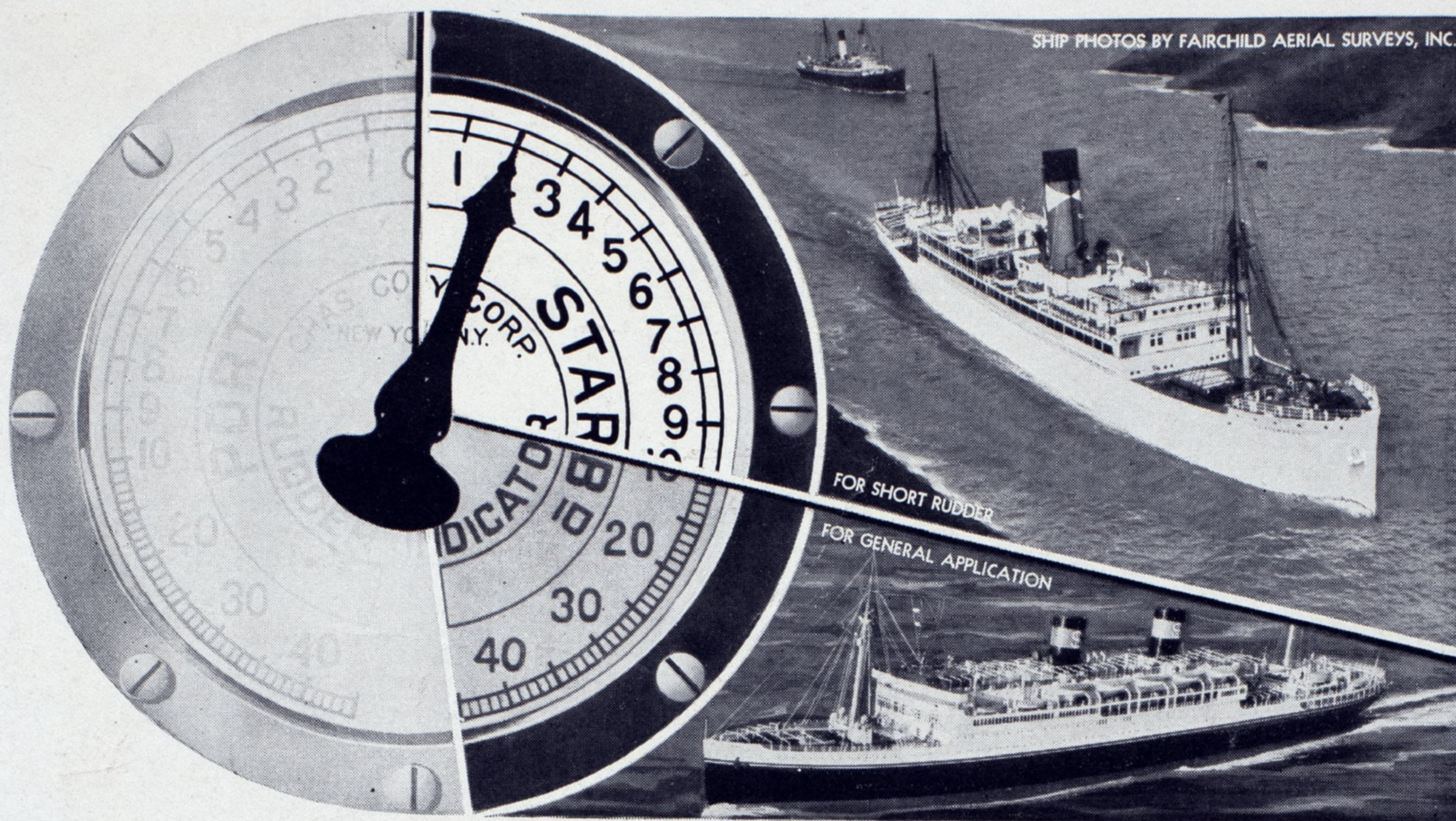
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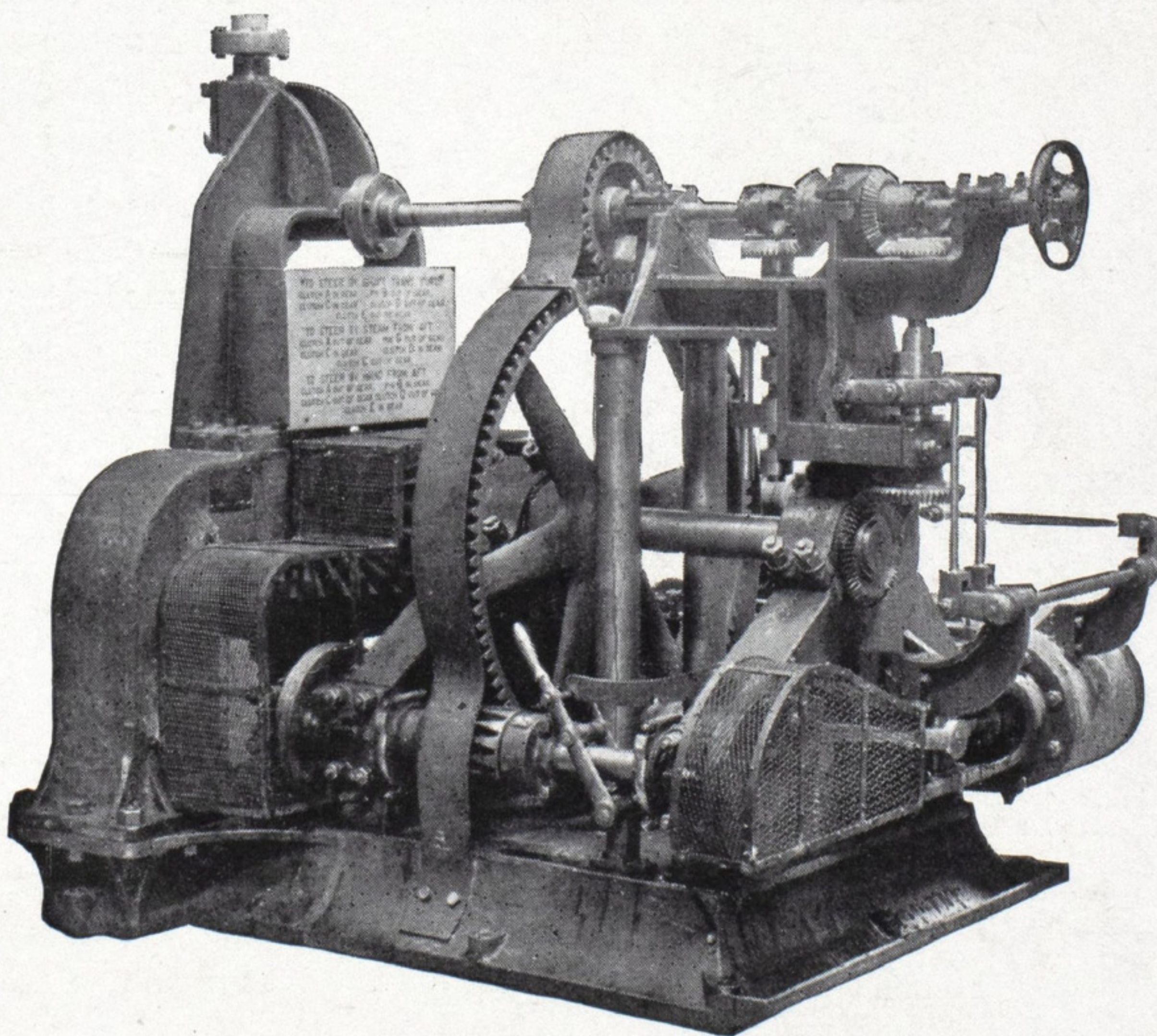
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